

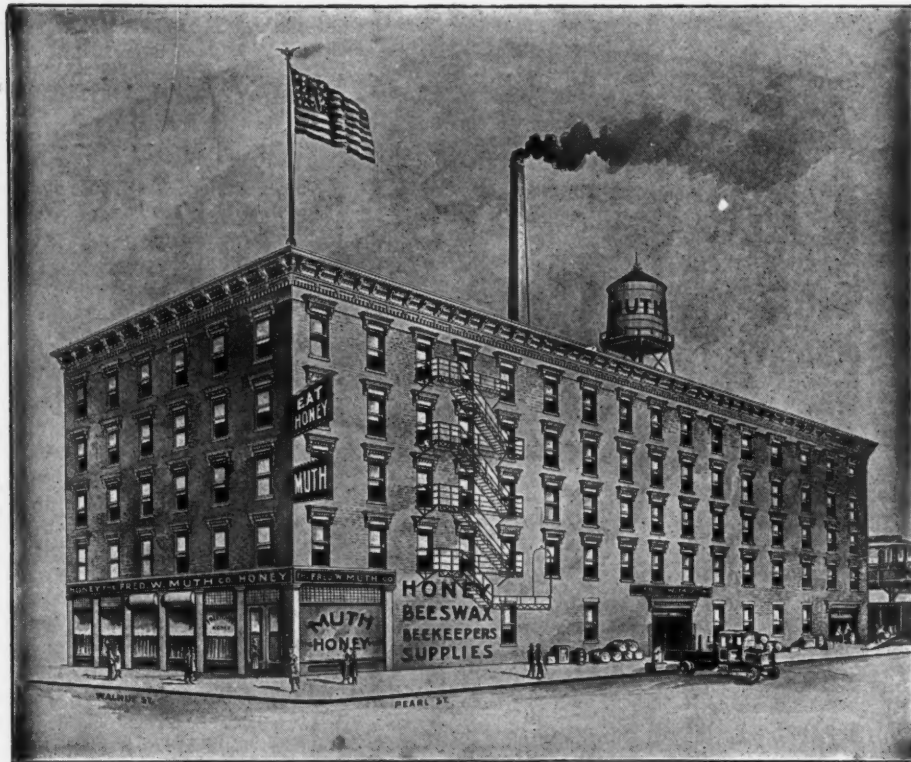
AMERICAN BEE JOURNAL

DECEMBER, 1919



REV. L. L. LANGSTROTH, INVENTOR OF THE MOVABLE COMB HIVE. BORN DEC. 25, 1810. DIED OCT. 6, 1895.

THIS HOUSE IS YOUR HOUSE. USE IT



WHAT THIS HOUSE DOES FOR YOU

IT BUYS

YOUR EXTRACTED HONEY
YOUR COMB HONEY
YOUR BEESWAX
RENDERS YOUR OLD COMB

IT GIVES YOU

SERVICE
PRICE
QUALITY
PROMPT REMITTANCE

IT HANDLES FOR YOU

LEWIS BEEWARE
ROOT'S SMOKERS AND
EXTRACTORS
DADANT'S FOUNDATION
HONEY CONTAINERS

HONEY

Send us a sample, tell us how much you have and what you want for it. We are always ready to buy. No waiting for your money when you ship to us. We remit the day your shipment arrives.

THE FRED W. MUTH CO. Pearl and Walnut Streets
CINCINNATI, OHIO
"THE BUSY BEEMEN"





Four Bee Books

YOU SHOULD HAVE
IN YOUR LIBRARY

First Lessons in Beekeeping

By C. P. DADANT

A 175-page beginner's book, well illustrated and cloth bound.

Price \$1
Mailing weight, one pound

A Thousand Answers to Beekeeping Questions

By C. C. MILLER

Supplements other books by answering questions not usually taken up. Cloth bound; 290 pages.

Price \$1.25
Mailing weight, two pounds

Practical Queen-Rearing

By FRANK C. PELLETT

Gives all the modern queen-rearing methods, simply. A good book for both the scientific queen-breeder and the amateur. Cloth bound; 110 pages; illustrated.

Price \$1
Mailing weight, one pound

Langstroth on the Honey Bee

Revised by
C. P. DADANT

"The Classic in Bee Culture"

A full treatise on beekeeping. Cloth; 575 pages.

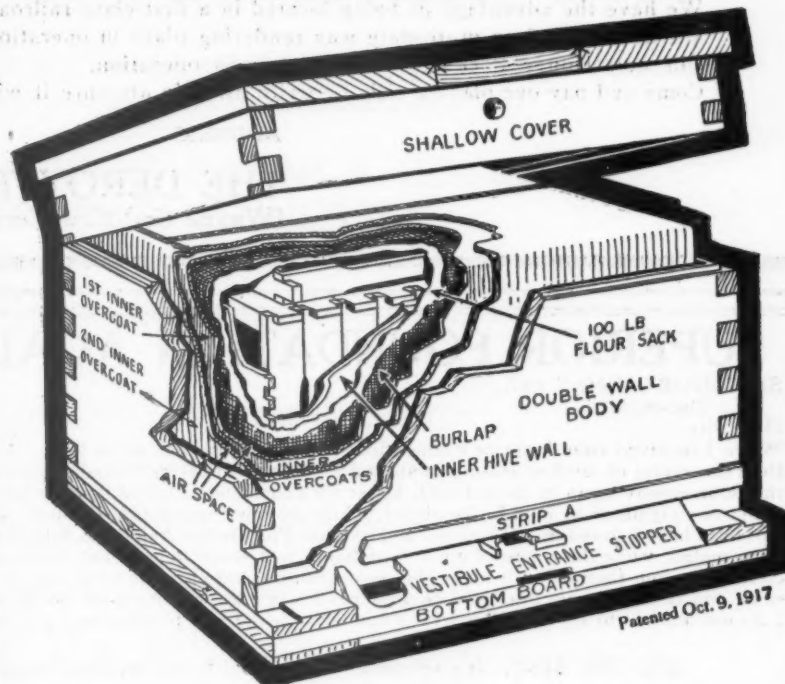
Price \$1.50
Mailing weight, three pounds

ALL FOR SALE BY
AMERICAN BEE JOURNAL
HAMILTON, ILLINOIS

Winter Problem Solved

BY THE

Hive with an Inner Overcoat



NOW FURNISHED WITH JUMBO DEPTH OR STANDARD HOFFMAN FRAMES

In January of this year, Mr. Pellett, the associate editor of the American Bee Journal, wrote us suggesting that we place on the market, Protection Hives with Jumbo depth frames. He stated that if we could furnish them with 1 1-2 inch spacing, that in his opinion we would have very nearly an ideal hive, and if he was again to engage in commercial honey production, this would be the hive that he would want. Numerous like requests from other bee keepers for this same equipment have been received.

We are now prepared to furnish Protection Hives with standard Hoffman frames the same as in the past, or standard Jumbo depth frames ten to the hive body, or those with 1 1-2 inch spacing nine frames to the hive body. The same size covers, bottoms and rims as used in the past will be supplied, the only difference will be in the depth of the hive body when Jumbo frame is wanted.

Standard single hive, comb or extracted honey supers or bodies in the 10 frame size, are regular equipment for Protection Hives.

Send for a new special circular of the Protection Hive which has just been issued.

TIN HONEY PACKAGES

2 lb. Friction Top Cans in cases of 24. 5-lb. Friction Top Pails in cases of 12.
3 lb. Friction Top Cans in crates of 612. 5-lb. Friction Top Pails in crates of 100.
2½-lb. Friction Top Cans in cases of 24. 5-lb. Friction Top Pails in crates of 202.
2½-lb. Friction Top Cans in crates of 450. 10-lb. Friction Top Pails in cases of 6.
10-lb. Friction Top Pails in crates of 118.

SPECIAL PRICES

Crates of 100 five-pound pails, \$8; crates of 200 for \$15.
Crates of 100 ten-pound pails at \$12.50. Sixty-pound cans, two in a case, at \$1.15 per case. Shipments made from Michigan, Ohio, Illinois and Maryland factories.

A. G. WOODMAN CO.

GRAND RAPIDS, MICH., U. S. A.

Prepare for 1920 now, and take advantage of our early order discounts and you can save money by writing us for the following reasons.

We have a complete stock of all kinds of Standard Bee Hives and Sections, Dadant's Foundation, General Bee Supplies, Wax, Honey and Honey Containers at Newark, New York.

We have the advantage of being located in a first-class railroad center.

We have a modern up-to-date wax-rendering plant in operation.

Our new Honey Packing Department is in operation.

Come and pay our plant a visit, or write us. We are sure it will prove profitable to you.

ADDRESS

THE DERROY TAYLOR CO., Newark
(Wayne Co.) New York.

SUPERIOR FOUNDATION AGAIN EXCELS READ THE FOLLOWING

SUPERIOR HONEY CO.,
Ogden, Utah

Gladys, Va., R. F. D. No. 2
October 10th, 1919

Dear Sirs:

When I received your Superior Foundation the clover flow was at its best. After removing a couple of frames of brood from the center of my best colony I inserted a frame of Superior Foundation and a frame of the other make. Upon opening the same colony again in the evening, about six hours later, I found that the bees had drawn out your Superior Foundation about one-eighth of an inch in the center, while the other foundation was untouched. When I next opened the hive about two days later I found that the frame of Superior Foundation had been fully drawn and some cells along the top bar had been sealed, while the frame of other foundation had some honey, but none sealed. When the queen laid in the frame containing your foundation it made the most beautiful brood frame of the two. I made several other tests with similar results, and consider them fair tests, as the other foundation was the same weight and freshness, being purchased this spring. I do not hesitate to say your Superior Foundation is the best foundation I have ever seen. I am yours for business,

B. E. JOHNSON

USE THE BEST. If your dealer cannot furnish you Superior Foundation write us for special prices.

SUPERIOR HONEY CO., Ogden, Utah (Manufacturers of Weed Process Foundation)

The Diamond Match Co.

(APIARY DEPT.)

**MANUFACTURERS OF
Beekeepers' Supplies**

CHICO, CAL., U. S. A.

Dadant's incomparable Foundation is always kept in stock. Western Beekeepers can be supplied advantageously.

BEEKEEPERS, wherever they may be located, before deciding where to obtain supplies, should write to The Diamond Match Co. for prices, and for their Beekeepers' Supply Catalogue.

This Company are the largest manufacturers in the world who make Bee Supplies. They own their own timber lands, mills and factories, and supply goods direct from the tree to the beekeeper.

Full advantage of this low cost of production is given to the purchaser.

The Apiary Department (which is in charge of experienced supply men, who are also practical beekeepers) maintains a constant excellence of product and offers unsurpassed service.

The Diamond Match Co.

Apiary Department

CHICO, CAL., U. S. A.

Read "THE BEEKEEPER"

The only Canadian bee publication. Keeps beekeepers closely in touch with Apicultural conditions in Canada. It is the official organ of the Beekeepers' Associations for the three provinces—Ontario, Manitoba and New Brunswick. Beekeeping and horticulture are effectively combined to make a live, attractive and practical publication.

Price, postpaid, \$1 per year

United States, \$1.25

Foreign, \$1.50

Send for a free sample copy

The Horticultural Publishing Co., Ltd., Peterboro, Ontario

TELL WHAT YOU KNOW

The Western Honey Bee offers cash and other prizes in a competition (ending March 1) for articles pertaining to the work of beekeeping. Try your hand; anyone can compete, whether a subscriber to the Honey Bee or not. Send for a sample copy (free) containing particulars. Address

WESTERN HONEY BEE

121 Temple St., Los Angeles, Calif.

SOUTHERN BEEKEEPERS

will be glad to know that the service their increasing patronage demands has been met by the establishment of a

LEWIS BEEWARE BRANCH HOUSE AT MEMPHIS, TENNESSEE

Carloads of beekeeper's supplies of every description will be kept on hand in our Memphis warehouses at all times. We will make every effort to see that no beekeeper is disappointed in an effort to get "Lewis Beeware"

For 46 years southern beekeepers have been using Lewis "Beeware." We pride ourselves that their good judgment is to be met with ever-increasing facilities for them.

Correspondence may be addressed to the

10-12 S. Front
Street

G. B. LEWIS COMPANY

MEMPHIS,
TENN.

TENNESSEE-BRED QUEENS

Forty-Seven Years' Experience in Queen-Rearing
Breed Three-Band Itallans Only

	Nov. 1 to June 1			June 1 to July 1			July 1 to Nov. 1		
	1	6	12	1	6	12	1	6	12
Untested	\$9.00	\$ 8.50	\$15.00	\$1.50	\$ 7.50	\$12.50	\$1.25	\$ 6.50	\$11.50
Select Untested ..	2.25	9.50	18.00	1.75	9.00	16.00	1.50	7.50	12.50
Tested	3.00	16.50	30.00	3.50	12.00	22.00	3.00	10.50	18.50
Select Test.d	3.50	19.50	35.00	3.00	16.50	30.00	2.75	15.00	27.00

Capacity of yard, 5,000 queens a year.
 Select queen, tested for breeding, \$5.
 The very best queen, tested for breeding, \$10.

Queens for export will be carefully packed in long distance cages, but safe arrival is not guaranteed. I sell no nuclei, or bees by the pound.

JOHN M. DAVIS, Spring Hill, Tenn.

EXPERIENCE COUNTS

An experienced beekeeper in Iowa writes:

"I must say it is a pleasure to use Lewis Beeware. Have used some that was cheaper, but the difference in quality vastly more than compensates for the difference in price."

A word to the wise—USE LEWIS BEEWARE. Write today. Dept. B

WESTERN HONEY PRODUCERS
 1929-1931 FOURTH STREET
 SIOUX CITY, IOWA

MARSHFIELD GOODS BEEKEEPERS

We manufacture millions of sections every year that are as good as the best. The **cheapest** for the **quality**; **best** for the price. If you buy them once, you will buy again.

We also manufacture **hives, brood-frames, section holders and shipping cases.**

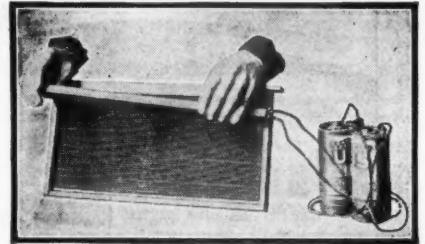
Our Catalog is free for the asking

MARSHFIELD MFG. CO., Marshfield, Wis.

BEES

We furnish full colonies of Italian bees in double-walled hives, single-walled hives, shipping boxes and 3-frame nucleus colonies.

I. J. STRINGHAM, Glen Cove, N. Y.
NASSAU, CO.



ELECTRIC IMBEDDER

Price without Batteries \$1.25
 Actually cements wires in the foundation. Will work with dry cells or with city current. Best device of its kind on the market.

For sale by all bee supply dealers
Dadant & Sons, Manufacturers
HAMILTON, ILL.

BEE SUPPLIES

Let Us Figure With You

Get our discounts before buying
 Largest stock in South West.

G. G. CLEMONS BEE SUPPLY COMPANY
 142 Grand Ave., Kansas City, Mo.

PORTER BEE ESCAPE SAVES HONEY TIME MONEY



For sale by all dealers.
 If no dealer, write factory
R. & E. C. PORTER, MFRS.
 Lewistown, Illinois, U. S. A.
 (Please mention Am. Bee Journal when writing)

Write for Price List and Booklet descriptive of

HIGH-GRADE Italian Queens

JAY SMITH
 Route 3
 Vincennes, Ind.



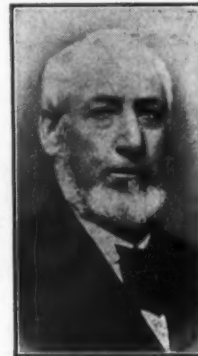
The Evolution of the Large Hive



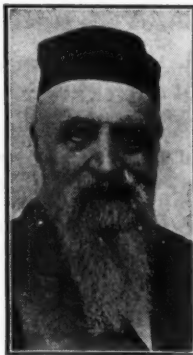
L. L. Langstroth

Previous to the time of L. L. Langstroth bees had been kept only in boxes and skeps. Langstroth saw the need of more easily handled combs. He perfected the movable frame hive, using the size frame now so commonly known.

Moses Quinby, accepting the movable feature of Langstroth, was quick to see that a deeper frame would provide a more complete circle for the egg-laying queen, and would provide more honey over the brood for wintering. Yet he confined his queens and bees to a hive with only eight of the Quinby frames. He still had a relatively small hive but with the proper depth.



Moses Quinby



Charles Dadant

Charles Dadant accepted the views of both Langstroth and Quinby, but experimented further with different size hives. The result of his many and varied experiments led him to the conclusion that a hive with ten Quinby frames produced strong colonies and large honey crops with a minimum of swarming.

The Original Dadant Hive did not adapt itself to the use of the great amount of Langstroth equipment already in use. Moreover it was very expensive. To remedy these two drawbacks, we have evolved and now offer

The Modified Dadant Hive

1. Eleven frames, Langstroth length, Quinby depth
2. 1½ inch spacing of frames for swarm control
3. Six-inch extracting super
4. Dovetailed body and regular reversible bottom and metal roof cover with inner cover
5. Langstroth equipment easily used in connection

Our more than forty years experience with bees convince us that this is **the** hive for **Extracted Honey**

If you want strong colonies, large honey crops, little swarming and good wintering, we believe this is the hive for you

Write today for descriptive booklet and prices

DADANT & SONS, Hamilton, Illinois

A "BEEWARE" LINE FROM WOODS TO YOU



Your orders are our obligations and we begin their fulfillment in the woods. While you plan your Christmas gifts by the fireside, dozens of workmen are toiling in the frozen north woods for you. There they choose fine basswood and sturdy pine, to be made into "Beeware." At the factory experienced workmen cut and shape the lumber and men grown old in "Beeware" service test the product for exactness. These are some of the reasons why better beekeepers insist on Lewis "Beeware." A trial order is certain to convince any beekeeper.

LOOK
FOR



THIS
USUAL
MARK

You will want our forty-sixth annual catalog, to be issued soon. December orders discounted 3%.
There's a distributor of "Beeware" near you.

A MERRY CHRISTMAS AND A HAPPY
NEW YEAR TO YOU ALL

G. B. LEWIS COMPANY, WATERTOWN, WISCONSIN
MAKERS OF BEEWARE



NECTAR AND NECTAR SECRETION

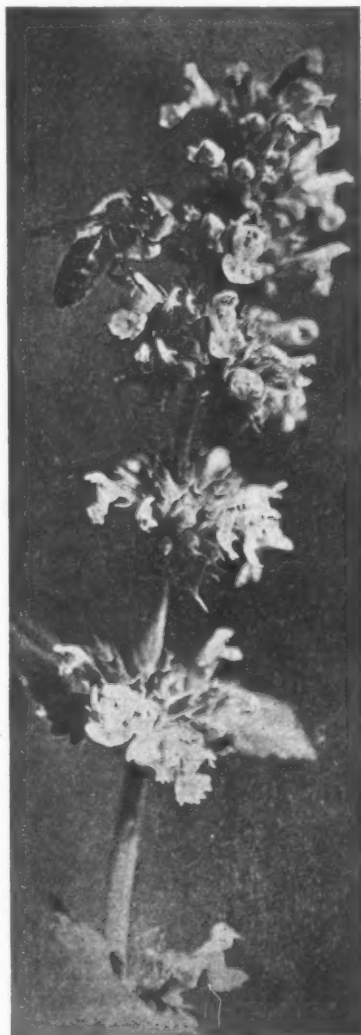
By Dr. Wm. Trelease, Botanist, University of Illinois.

THE great Swedish botanist, Linnaeus, nearly two hundred years ago, basing his classification of plants on their flowers, found it necessary to name and account for all of the parts of a flower. In many cases he found structures that were neither sepals, petals, stamens nor pistils; and as these contained or were wet with a sweet fluid, he gave this the fanciful name nectar—the drink of the gods—and called the parts of the flower that produced or contained it, nectaries.

As these nectaries were different from stamens and pistils, which Linnaeus recognized as the sexual organs of flowers, though they are sometimes connected with them, and as they were different from ordinary sepals and petals, though sometimes connected with them, they presented something of a question mark to the men of that day who were curious to know what the parts of a plant really are and what they do. For this reason the study of nectaries became something of a popular diversion for a generation or two; and a general idea that they are organs for secreting sugar became established; not necessarily an idea of secretion, though, for just as animals excrete various organic substances that are by-products, or waste from some of their functions, so it was thought by some students that the sugar of nectar might really be an excreted waste or surplus rather than a substance secreted because it is to become useful to the plant.

Toward the end of the Eighteenth Century a German rector, Sprengel, who seems to have found in Nature a good deal of inspiration that he failed to put over, noticed that the petals of the common German wild geranium were fringed with hairs at their bases. That was in the day before men believed in evolution, but when they did believe in a purposeful creation. Sprengel was convinced that an all-wise Creator would not

have made a single hair in vain, and he set about discovering what these hairs were for, much as a sensible



Honeybee on Hedge Nettle.
(Photographed by Professor C. F. Hottes).

person seeing the governor on an engine today would try to find out what it is for. Below the break between two petals, he found a nectar gland, producing its sugary fluid; and he saw the hairs would prevent the nectar from being diluted or washed away by rain or dew. This brought him back to the original question—what nectaries and nectar are for. He got his answer to this by watching the plant and seeing that bees visited the flowers, and removed the nectar as what might be called the raw materials of the honey industry.

In Sprengel's day, the general impression was not only that things have been created just as we find them, but created for our own ultimate good. So Sprengel found an answer in discovering that the hair fringe of the geranium petals protects the nectar of the flowers and so preserves it for bees to use in manufacturing honey for our breakfast table.

It is not necessary to walk down Michigan Boulevard on a windy day to realize that we belong to an initiative race. The corner grocery and the drug store show it as well as the windows of milliners and dress-makers, shoe shops and news stands, or as the signs that issue from a barber shop in a college town.

When you stop to think about it, Sprengel could hardly have had the curiosity to study out his geranium question to an answer without being spurred to look at other flowers to see if they might not have something interesting of the same sort to offer. He yielded to the impulse to look at other flowers, and he found his geranium to be a very drab specimen compared with some of the irregular and painted flowers that he studied out in the same way. He must have felt no common pride when, in 1793, he published the results of his studies, with simple but effective illustrations, under a title that meant the discovered secret of

nature in the structure and fertilization of flowers.

But Sprengel seems not to have been the sort of man to whom such an answer really was an answer, and he looked further. It does not seem to have taken him long to see that while gathering their own store of honey, and obviously without consciousness that they were doing anything else, the bees became dusted with pollen from geranium stamens and rubbed it off on geranium stigmas while going their rounds of the flowers. This conclusion evidently answered two questions—what the hairs are for, and what nectar is for.

Fashions run in fads and interests quite as much as in dress. Linnaeus was a great botanist; perhaps none has been greater. He not only reduced a chaotic science to order, but interested men in its study to a remarkable extent. It is rather unfairly charged against him that because his service was somewhat one-sided, those whose interest he awakened were extremely one-sided, in that they did not see or care for much in botany beyond finding, describing and classifying new plants. This was well enough worth doing; it is not finished yet, and will not be finished for many years to come; but it had become so fascinating and workable through the genius of the Swedish master that his followers seized it with eagerness, and it was a long time before a mind of original

habits and impulses broke loose from the train.

The man who possessed this originality was Darwin, the author of the now universally accepted idea of organic evolution. To him has been ascribed the introduction of a new teleology into natural science recognizing that structures and functions are, because they are, or have been, of use—not of use to man necessarily, though man may turn them to account, but to their possessor.

This was Sprengel's conclusion as to the nectar of geranium flowers, which he found led to their fertilization. The essential difference between his way of seeing it and Darwin's is that he thought the entire mechanism had been specially made by the Creator as a means to an end, while Darwin saw in it the gradual modification of earlier structures because the new were helpful in the struggle of life and their possessors for this reason were likely to survive and pass them on to their offspring.

There is a German country saying that the honey-bee was forbidden the clover because she didn't keep Sunday. Beekeepers know that her tongue is a little too short for the honey tube of the red clover flower and that she doesn't waste time in trying to get what is out of her reach. They know, too, that some races of honey-bees really can suck the red clover nectar because they have long-

er tongues, and if beekeepers ever want to do it they can probably set an expert plant breeder to work at breeding a race of red clover with a tube short enough so that even the German honey-bee can get at its nectar. Natural evolution hasn't done this. Where red clover is at home bumblebees are found, and bumblebees have no difficulty in reaching its nectar much as hawk-moths get that of a moon flower which is far beyond the reach of any kind of bee. But in the South Seas, where there are no long-tongued bees, red clover finds itself as unable to set seed as the German honey-bee is to get at its nectar. Bee and flower have evolved together where both are at home, into a harmony of structure that is helpful to them both.

Nothing was more suggestive to Darwin in his search for evidences of evolution—or modification through descent, than this sort of harmony of structure and habit in flowers and insects; and one of his earliest and most effective books in bringing his views to the comprehending notice of others was the dealing with the mutual relations between those freaks in flowers, the orchids, and their insect visitors.

For Sprengel's teleology, Sprengel's explanation of nectar as a means of securing fertilization was sufficient. For Darwin's teleology, it carried another question: why? The geranium flower has both stamens and pistil, standing in its middle. The one might fertilize the other just as well as not, apparently, and yet this does not happen, for the pollen-bearing anthers of the stamens drop off before the stigmas of the pistils come to maturity. The same thing may be seen on any single-flowered "geranium" in a bay window or a greenhouse, or a summer window box or flower bed (only this "geranium" does not belong to the genus *Geranium* of the botanists, but to the related African genus *Pelargonium*).

Looking for a further reason, Darwin saw a step further into the mystery when he found that these and many other flowers that ought to get on without any help are as dependent upon insects through their own failure to bring pollen and stigma together as those are in which stamens and pistils are borne in separate flowers—often on separate plants. To him, nectar and its attendants—flower fragrance, color, variegation, guards of hairs or some other structure—meant what they had meant to Sprengel, fertilization through insect aid: but they meant something more, fertilization of one flower by pollen from another flower-crossing.

And still the questions multiply. Why do not all flowers have stamens and pistil side by side. Why when they have this structure, do they not time the maturity of these essential parts so as to secure effective functioning without all the nectar machinery? In other words **Why** is crossing so commonly necessitated and provided for?

Science of every kind has been advanced by three methods; reasoning,



Sprengel's title page.

observation, experimentation. Sprengel's answer was reached by the first two; the new answer sought by Darwin was to be obtained through the third. For eleven years he put the question direct to the plants themselves; fertilizing them by their own pollen; cross-fertilizing them; raising and re-questioning their offspring. More and stronger progeny from crossing was the answer.

The popularity that Linnaeus had given to characterizing and classifying living things, was transferred by Darwin to studying their structure and doings. Sprengel's idea fell upon barren soil, Darwin's was cultivated with care and skill.

Two men, Mueller, a German, and Delpino, an Italian, stand out most prominently among a multitude who observed and wrote and pictured the marvels of flowers and insect harmonies for a generation. All did excellent work in furnishing new details and corroborations, but Darwin had answered the question as to the what and the why of the nectar of flowers.

But there is nectar that is not produced in flowers. Look at the queer spots in the angles between the veins on the under side of a Catalpa leaf, when it is young, or at the little goblets on the stalk of a cherry or peach or snowball leaf, or at the pin-head spots on a trumpet-creeper or peony calyx, and you may see glands there that secrete a sweet fluid. Bees may not care for it, but wasps or ants do. The cotton plant has such nectar glands on the outside of the cluster of bracts about each blossom, and on the back of its leaves.

In a very few cases such "extrafloral" nectar serves the same purpose as that within the flowers; but generally it does not lead to fertilization. Delpino called the nectar that leads to fertilization "nuptial" nectar, and the other "extranuptial."

In the seventies of the last century an English mining engineer, Belt, well known in the ore regions of Colorado, was marooned by his profession on a mining property in Nicaragua. Using his eyes took the place with him of tennis, or of dissipation, which is the white man's bane in the tropics. He saw that a certain sort of ants cut the leaves of trees into bits, which they take into their nests, and that roses and other introduced plants fared hard with these leaf cutters unless they were protected by aromatic oils, as various kinds of citrus leaves are, or in some other way.

Belt did not fail to notice that the ants visit extrafloral nectaries in numbers. In the case of those on some acacias he found the ants very pugnacious. I confess that in Guatemala I have preferred, myself, to go around a bush or a grove of such acacias with their ant guards. As with Sprengel's geranium hairs, these nectaries unfolded question after question.

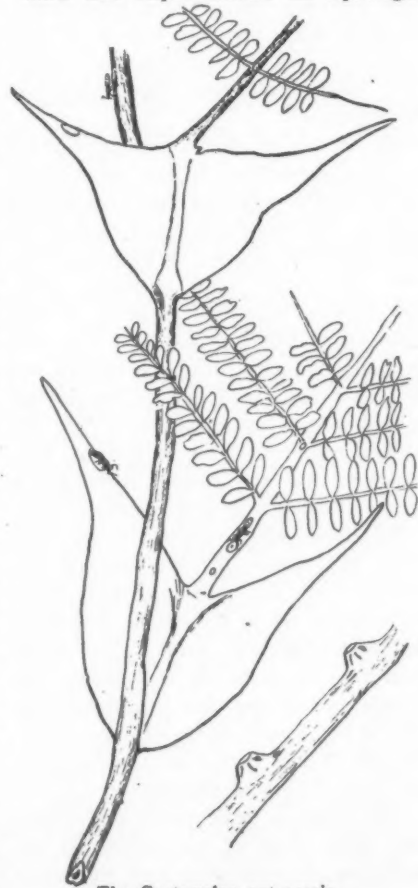
In Belt's case, the tips of the acacia leaflets ripen up also into little fruit-like bodies that the ants gather and take into their nests; and they make these nests in the stipules that

flank each leaf and sometimes are shaped like a pair of small buffalo horns. It is an interesting undertaking to get the ant census of an acacia twig of this sort. The danger may not be as great, but it is as real and perhaps as painful as in taking the census of a mountain valley noted for moonshine traffic.

Belt drew the conclusion that extranuptial nectar, sometimes supplemented by solid food and shelter, is of use to the plant that provides it by maintaining a bodyguard of ants on plants that otherwise would risk defoliation and injury by leaf-cutters or grazing animals; much as Sprengel and Darwin found an explanation of nuptial nectar in the benefit of insect pollination of the flowers.

This is the simple story of nectar, simply told, as it has been seen by many observing and thinking men. But it is not a story free from complications. Our blue violets rarely set fruit from their showy nectar-bearing flowers; but their main reliance for seed is on flowers produced below the leaves, and these do not open, but are self-fertilized. The beautiful *Poinsettia*, with its brilliant red bracts and large cups overflowing with thick nectar, does not fruit in West Indian gardens any more than it does in our greenhouses at Christmas time. And irresistibly pugnacious as the acacia ants are, those that visit our peonies and cassias and other plants do not usually more than protest mildly if we molest the plants that they are on.

Are the explanations of Sprengel



The Guatemalan ant acacia.

and Darwin, and of Belt wrong? No others that are at all satisfactory have been offered.

When one stops to think of it, the secretion of nectar is an unusual phenomenon. Sugar is made within plants and it does not leak from them unless they have been injured. The sugar beet takes various substances out of the soil water, but it does not permit the passage of sugar into the soil water. And yet nectar, essentially sugar, is passed out of the plant, within which it was manufactured. This is because it is secreted, or excreted, through specialized glands. Everyone who grows plants in a bay window has seen young clover or grass leaves with a drop of water on their tips at some time or other. A few grains of bird seed in a flower-pot covered by a pane of glass will show this as quickly as the seedlings come up.

These drops pass out finally through pores; but they are drops of water and not nectar. If we can imagine a gland behind such a water pore, secreting sugar—letting it really get out of the cells with or into the water—we can picture a nectar gland. Such glands occur in some flowers. Some botanists believe that extranuptial nectar glands were originally water glands that have acquired the habit of secreting sugar.

This habit is a very unusual and a very peculiar one. It is not readily understood except as it may be connected with usefulness to the plant. If this usefulness is not indirect, in the ways suggested by Darwin and Belt, or otherwise, it must be direct. Water glands relieve over-pressure when absorption is high and evaporation low; in some of the calla family the water even spurts from the tips of the leaves at times. But sugar is not like water, taken in in quantity and to spare; it is manufactured, and in the case of nectar glands it is manufactured where it is secreted. Nobody has yet suggested any physiological function of plants calling for sugar safety-valves situated in the queer positions occupied by extranuptial nectar glands; and no satisfactory direct physiological explanation of the nuptial glands has been suggested.

The actual status of nectar in botanical science is about this: when it is produced in flowers, and in some cases when it is outside of them but near them, it demonstrably serves to secure cross-pollination through the aid of insects, or humming birds and their like, when the flowers are long, tubular and red, as in the trumpet creeper, the trumpet honeysuckle and the scarlet salvia. It is then "nuptial nectar." When it does not serve the plant in this way, and so is "extranuptial," it occurs in the neighborhood of the flowers, as in cotton, sweet potato, trumpet creeper and peony, where it attracts numbers of ants, which are often very pugnacious and to the extent of their activities it prevents injury to the essential flower buds and flowers, especially in their early stages; or it occurs on developing leaves during

the period of their greatest need. More rarely, as in the acacias, the leaves continue to secrete it through the season, so that those that are mature add to the protection of the younger leaves and the flowers and the young fruit.

That neither of these functions is served in exceptional cases and that some flowers rely on the wind for effective pollination, or have lapsed into self-fertilization; or that really pugnacious ants do not commonly frequent the extranuptial glands of

most plants in temperate regions, and that some plants get along very well without such help, mark questions that will continue to stimulate observation and experiment. But nothing now known of the physiology of plants offers an alternative explanation for that which connects nectar with either pollination or defense; and until such an explanation can be found, nectar will continue to be regarded as connected indirectly with these services through insect or bird relations.

AMERICAN BEE JOURNAL

Established by Samuel Wagner in 1861

The oldest Bee Journal in the English language. Consolidated with The National Bee Journal in 1874.

Published monthly at Hamilton, Illinois.

Entered as second-class matter at the postoffice at Hamilton, Illinois.

SUBSCRIPTION RATES—In the United States and Mexico, \$1 per year; three years, \$2.50; five years, \$4. Canadian postage 15 cents, and other foreign countries 25 cents extra, per year.

All subscriptions are stopped at expiration. Date of expiration is printed on wrapper label.

(Copyright 1919, by C. P. Dadant.)

THE STAFF

C. P. DADANT Editor
FRANK C. PELLETT Associate Editor
C. C. MILLER Questions Department
MAURICE G. DADANT Business Manager

THE EDITOR'S VIEWPOINT

Brood in the Super

Foloppe Bros., in the "Revue Française d'Apiculture" report that whenever the bee-escape has failed to remove the bees, it was because of brood in the super. It appears that worker-bees will not desert brood. This is logical and may explain the rare reports of failure of a bee-escape in removing the bees from the supers. The queen's presence in the supers would have a similar effect.

Aeroplanes for Beekeepers

In the October Gleanings, the old veteran, A. I. Root, tells of taking a short trip at Medina, in an aeroplane. Fourteen years ago there were only 3 automobiles in and around Hamilton, Ill. On the day of the armistice, 13 years later, 443 farmers' automobiles were counted in Hamilton. Who knows but in 12 or 14 years we will all (those of us still living) be riding around in aeroplanes?

Overworking the Queens?

We don't wish to criticize the statements of other publishers on matters of theory. But there are instances when it seems necessary.

The Western Honey Bee, in its September number, page 291, quotes

rather approvingly a statement by Mr. Thos. F. Cobb, in the British Bee Journal, that the "overworking" (overlaying) of the queen is the cause of lack of stamina, and therefore of the diseases that afflict the honeybee.

As we see it, the queen lays more or less, according to her capacity to develop the eggs in her ovaries as fast as the food supplied to her by the bees will allow. When her ovaries are empty she is done. Similarly when the male sperm is exhausted in her spermatheca, she lays only drone eggs. But we fail to see in what way the speed of her laying would affect her progeny. Are the chicks hatching from a prolific hen, properly fed, any weaker than those from an inactive hen, slightly fed?

All beekeepers who have watched a prolific queen at the time of her greatest egg-laying know that if she is interrupted in her work, her eggs will drop "like ripe fruit." The question for us to settle is whether we should encourage this prolificness by giving her ample room easy to reach, or reduce her laying to the capacity of a small brood-chamber.

The English beekeepers use either the small skep of straw, or the diminutive British standard movable-

frame hive. This hive is reported, in the British Bee Journal of August 28, as containing only 2,400 square inches of comb surface, as against 4,800 of the Dadant-Blatt hive, which they acknowledge is the standard in many parts of Europe.

It seems strikingly evident that, if the greater or less laying of the queen has anything at all to do with the diseases of the adult bee, such as Isle-of-Wight or paralysis, the present condition of English beekeeping would indicate that the small hives, in which the queens cannot fully develop their fertility, are the ones that cause the trouble.

We kept bees for some 40 years in the large hives, larger than the average Langstroth, before we ever saw foulbrood. We saw but isolated cases of paralysis, and never anything resembling Isle-of-Wight disease.

We are inclined to take the view that there would be less Isle-of-Wight disease in England if they used large hives. It seems to us much more plausible to expect strong colonies to withstand the changes of climate, the effects of mould or of moisture, than weaker ones. We see nothing unnatural or forced in the active laying of a prolific queen, when she is plentifully fed by her workers. Whenever her spermatheca or her ovaries are getting empty, it is time she should be superseded. Our American beekeepers are getting in the habit of superseding their queens at the end of the second year, to avoid any delay or inaction on their part. We believe that is right.

Let our British cousins give a fair and full trial to large hives, not singly or isolated, but in ample apiaries, as we have done. They will then be able to compare results knowingly with the small hive man.

The British Frame

The British standard frame contains 236 square inches of comb surface. The Langstroth approximately 320. Referring to this matter, R. B. Manley writes in the British Bee Journal of August 21:

"The British standard (hive) is too small for a good strain of Italian or hybrid bees. It is weak and inconvenient, and to get room has to be tiered up too high.

"It will be found that bees winter better and increase very much more rapidly in spring on large combs. The queen will extend on a large comb

when she will not move to another comb."

Right, Brother Manley, we have talked ourselves hoarse explaining this. But even your 16x10 combs are not large enough, and you would say so if you ever tried larger ones on a sufficient scale. That was our experience and many are getting awakened to that fact.

ARE WE GOOD SAMARITANS?

Third List, Belgian-French Relief

Cash subscribed in former lists.	\$272.85
Porter C. Ward, Allenville, Ky.	5.00
H. Christensen, Toppensish, Wash	10.50
S. Barbeau, St. Eustache, Quebec	5.00
C. E. Fowler, Hammonton, N. J.	5.00
F. E. Millen, Guelph, Ontario	5.00
I. N. Arnold, Kanola, Iowa	5.00
J. F. Diemer, Liberty, Mo.	2.00
R. E. Newcomb, Cleveland, O.	5.00
A. S. Ferry, Naugatuck, Conn.	5.00
L. Van Butsele, Collinsville, Ill.	1.00
F. W. Lesser, East Syracuse	10.00

Total cash subscription to November 9

Queens promised:

Former lists	83
Ben G. Davis, Spring Hill, Tenn.	50
Hardin S. Foster, Columbia, Tenn.	25

Total number of queens promised

Of the above number of queens, 123 are from Tennessee. Are beekeepers of Tennessee more generous than those of other States?

Additional supplies promised value \$324.

Adding up these different items, we have already about \$800 in value promised, and all the cash is paid in. We should readily get \$5,000. This would make a donation worth while, especially when we transfer it into the sadly depreciated currency of Belgium and France. Late news indicates that France has less than half the number of bees owned a few years ago, in the undamaged regions, while the devastated areas are entirely bare.

This is the holiday month. Come on, friends, and make a little Christmas present to your brothers across the water. We will prove once more that "A friend in need is a friend indeed."

All donations will be published and the destination of the gifts will be made known as soon as arranged.

Bear in mind that, when you subscribe to charitable organizations, you are entitled to deduct the amount from your income tax report, thus lessening your tax.

Direction Bees Fly

In the British Bee Journal, contributors discuss the direction in which bees fly. One man says they go against the wind, "presumably to have the wind in their favor when coming home." Is it not rather because the wind brings them the odor of the flowers?

The Dadant Apiaries in 1919

A number of readers ask for a report of our bee season of 1919. Here it is:

We began the season with something over 550 colonies in 9 apiaries. There was no white clover at all. So we could not expect much of a crop. To cap the climax, the spring season was very dry. Having bees in plenty and nothing for them to do, we concluded to make some increase artificially, and raised the number of colonies to about 730. We were hoping for a fall crop of persicarias (heartsease) and Spanish needles, of which there is always a fair amount in average seasons in this section. But the drought did not permit them to develop so as to give us any hopes of a crop, and we faced the probable necessity of feeding largely for winter, when sugar was scarce and high. Not a very delightful prospect, indeed.

The Mississippi river was high during the spring months. For that reason there was more moisture than usual on the low lands which are protected by levees, for quite a great deal of water seeps through the sands, from the big stream. A visit to the low bottom lands situated from 10 to 30 miles from us convinced us that it would pay to again practice nomadic beekeeping. So some 400 colonies were moved to the bottoms. With some 240 already located near the edge of the bluffs, above the bottoms, we thus had approximately 640 colonies near immense fields of fall flowers. About 300 of them were right in the center of the bottom lands.

The bees were moved on our two large trucks capable of taking 60 of the large Dadant hives at a trip. This is where the small hives would have the advantage. But we are quite sure that their crop would have been less than that of the large hives.

The hauling was done the last of July, the bees transported an average of 30 miles. The caps and supers were carried separately, each brood-chamber being covered with a wire screen nailed on a strong wooden frame fastened on the brood-chamber with staples. The hives were closed at 4 o'clock in the morning, on cool nights, loaded and hauled at once, so as to reach the destination by 7 o'clock.

Had the colonies been as strong as is usually the case in July, the crop would have been immense. As it was, the harvest from Spanish needles, boneset, persicarias and asters was 78 barrels, or something over 40,000 pounds.

The bees are now back in their respective apiaries on the hills for the winter. Although the clover prospect is not very promising, we believe that they will do better on the hills next spring than on those low lands where there is little early bloom outside of willows and a few spring flowers.

Do Bees Need Water in Transportation?

The late Harbison, of California, the first man to ship colonies of bees in large numbers from New York to California by way of Panama, a journey of 5,900 miles, in 1857, wrote as to the need of water by bees in transit:

"Bees do not need water in transit. The different management of bees by different parties who shipped them from New York to California, is proof in point; those who did not water or feed any during the voyage succeeded much better than those who did so regularly; this was the result as tried side by side on board the same ship."

Bees do need water, and very urgently when they have brood to feed, though they can get along some time without it.

Attend the Meetings

Beekeepers today have more chances than at any time in the past to extend their knowledge of bees by attending meetings. Besides the regular State meetings, many counties meet, department experts conduct courses and State experts give demonstrations.

No beekeeper is so well informed but that he can glean some good from contact with other beekeepers. A single idea in practical application may save, many times over, the cost of such trips.

A Bumblebees' Nest

By H. B. Parks

IN the study of any problem one must go far afield to gather the facts that make its solution possible. In the study of the honeybee, thousands have made observations on their behavior, and hundreds have made conjectures as to the manner in which the present high specialization of the species occurred, but only the few have studied the nearly related semi-social and solitary bees with a view to find in these the steps by which the honeybee reached its present state. Most closely related to the genus *Aphis* is *Bombus*. The bumblebees resemble the hive bees in the possession of three casts, in storing pollen and honey, in secreting wax, and in possessing the same social government.

The nest from which the following study was made was located on the Experimental Station grounds at College Station, Texas. Local history claims an age of three years for this colony and the contents of the nest seem to support the claim. It was located on a narrow strip of land between a fence and the cultivated field. The last furrow gave a low bank in which the nest was built. When investigated the nest had a covering of matted grass, dome-shaped and about 24 inches in diameter and a height of 8 inches above the surface of the soil. As originally built the dome had been on the unplowed land only, but with the increase of the years the roof had been extended until it covered the furrow and some part of plowed land. The original door was in the furrow, but at last, owing to the extension of

the brood-chamber, the door had been changed to one side.

Let it be said here that when one investigates Texas bumblebees' nests one does not use the methods of the ordinary beekeeper, as smoke only provokes the anger of the bumblebees, and a cloth veil is no protection. Equipped with a wire veil and covered with all the clothes one could walk in, the attack was made. Several ounces of ether were poured on the nest and a bell jar placed over it. This was done very early in the morning in the hope to get all the bees at home. However, it was forgotten that the bumblebees have the bad habit of sleeping on the under side of a leaf of some favorite honey or pollen plant. Scarcely had the bell jar been placed when in came a bee laden with pollen, and seemingly before one could plan just what to do, fifteen or twenty heavily laden angry bees were trying to sting even the fence posts. Seven of these warriors made center shots and the investigator retreated with considerable speed. With trusty net and cyanide bottle the second attempt was made. Thirty-five field bees were put into that bottle before the nest could be approached.

On removing the bell jar it was found that the grass dome was so matted that the ether fumes had not penetrated the nest. A hole was made through the roof and another dose of ether turned in, and in a few minutes all was quiet. The roof was composed of the blades of Bermuda grass so woven and matted together that it was torn apart with difficulty. This mass was 8 inches thick in the center and enclosed in it was found a genuine surprise. In a small cavity

that looked as if it might have been used for a long time, was coiled up a blue and green lizard, commonly called a whip-tail. Just what relationship exists between the lizard and the bees is unknown, but from the standpoint of protection from birds, animals, from summer sun and winter cold a better place could not exist for the lizard. Mixed with the grass was a large amount of dirt, which had been taken from the cavity below.

This cavity had been excavated in what had at one time been a cinder walk. The hole was circular in cross section, flatly oval in the transverse. The opening covered by the grass dome was about 8 inches across, the greatest inside diameter was 12 inches, at a depth of 6 inches, and a total depth of 9 inches.

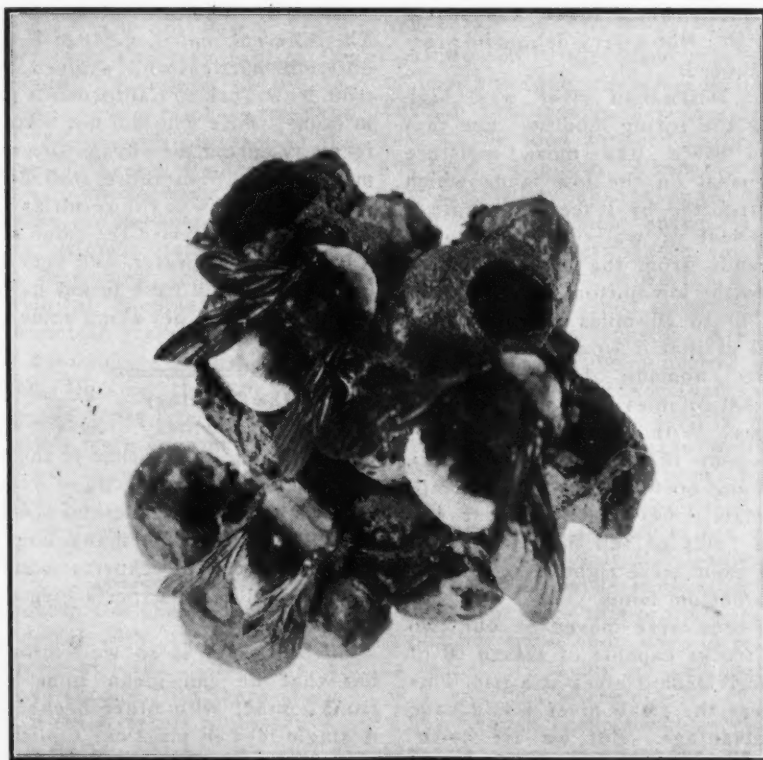
The removal of the grass dome revealed a sheet of capped cells forming a roof to the cavity, and so fitting it that only a bee-space was left around the edge. No adult bees were found on the surface of this comb, but in the depression made by the contact of each group of three cocoons was either an egg mass or larvæ. The larvæ varied from the size of a wheat grain to that of the ordinary "grub worm" of the garden. Under this sheet of comb was a cavity one cell's length deep. The sheets of comb were held apart by a number of single cocoons and strangely from these came only drones. In this opening were many workers, three queens and, seemingly unaffected by the ether, a number of full-grown larvæ squirmed amid the stupefied bees. This second layer contained some empty cocoons and a number of honey and pollen cells. The same conditions were found in the third and fourth layers. The fifth layer was an old one, green with mould and contained nothing to show that it had been used this year. Below this was a mass of older comb, all out of shape, and mixed in it hundreds of bee wings. No explanation can be given for this accumulation of wings.

Not a drone, guest bee or moth was found in the nest. Thousands of little mites were in the nest and on the bees. In two days following the taking of the nest, fifty field bees returned. These were captured by the well-known "jug method." At the end of this time no more bees visited this place.

The comb presented a peculiar appearance in that it was constructed of groups containing about a dozen cells each. Of these cells the following divisions can be made: Queen and worker cells, which are about the same size, and drone cells, which are longer and less in diameter than the others. In addition to these there were cells in which the eggs are laid.

The eggs are pearly white and are laid in a wax cell. This cell is generally placed at the juncture of three cocoons.

The larvæ were present in every stage, but not one was found in a cell nor was there a single partly sealed cell found. Several of the full grown



Newly emerged queens.

larvæ were kept in a pasteboard box several days and two of them constructed cocoons attached to the walls of the box. These pupæ failed to emerge.

When the nest was taken three old queens were found within. Four others were captured among the field bees. No queens were among the bees in the nest. The nest was taken September 10 and no queens emerged from the captured combs until September 20. From that date until September 30, 52 queens emerged. While these cocoons were given no special care, all the queens that appeared were perfect.

No drones were in the nest when taken, and none among the field bees. September 22nd the first drone emerged and on October 1st the last.

The workers were nearly as large as the queens and a very few of the dwarfed or undersized workers were in this colony. The last worker appeared September 18th.

No guest bees or moths could be found, but the yellow form of the drone long described as a guest bee was present in about equal number with those which are colored like the workers. All gradations between the two exist.

The honey found in this nest was water-white and extremely strong, and it appeared as if no evaporation had taken place. Honey was stored in three hundred and twenty-five cells, only a small amount being placed in a cell. In feeding, the newly emerged bee crawls into the cell and does not leave until the honey is exhausted and then it moves on to another cell and some field bee replaces the supply of nectar. No cells were sealed or had more than a few drops of honey in them. These cells were of three varieties, first empty cocoons, second empty cocoons that had wax additions around the top and third complete wax cells.

All of the pollen found was in wax cells, one-hundred and one varying amounts of pollen. Nineteen of these were sealed over. Several of the pollen masses were as large as a hazel nut. The wax used in the construction of these cells is largely mixed with plant hair and pollen grains. The wax was boiled out and was white. Beside making egg cells and storage cells out of the wax most of the cocoons had more or less of it scattered in lumps and an indication of wax base on which the cocoon had been built.

Of the facts stated here a number show the relationship between the solitary and social bees and the steps by which the honeybee reached its present state of development. In the solitary bees there is only the queen to take part in the rearing of the young. In *bombus*, one to several queens will live in harmony and a force of workers do the field work. Drones are produced only late in the year. The bumblebee secretes a very small amount of the wax while the solitary bees do not secrete any. It would appear that in the egg-laying and brood-rearing habits of the bumblebee is seen the origin of the double

comb. The steps by which this came into existence seem to be as follows: The solitary bee lays a single egg in a honey mass, in a dirt or wood cell, rearing but a single individual to the nest. The semi social improve on this and rear many young in separate but adjoining cells. The bumblebees, utilizing larger excavations, like a mouse nest, start as did the solitary bee, but lay a group of eggs in a single cell composed of wax within the larger opening. As this group of eggs hatches, the cell is extended until it becomes a flat mass on which the larvæ are fed. The full fed larvæ spin their cocoon in a group, the space between the circles being filled with wax, this gives a rude hexagonal one-sided comb. The later egg cells are located in the cavities between the caps of the first comb. As the eggs hatch the larvae crawl into the neighboring cavities and when these larvae spin their cocoons a double comb arranged just like the honeybee comb is formed. While this gives only two one-sided combs mismatched, however, it becomes two-sided as the larvæ seem to choose the thinnest place to cut through in emerging.

In the bumblebees themselves a gradation is shown toward the habits now exhibited by the honeybee. Observers report that in some species only one queen can exist in a nest and in other species only single eggs are laid in each cell and that cells are used many times for brood rearing. To sum up the relationship existing as shown by this nest a condition is found about midway between the solitary bee on one side and the hive bee on the other. The several queens living in harmony point toward the solitary bees, and the existence of a worker cast point to the hive bee. The secretion and use of wax in building cells, the placing of the cocoon to form a rude hexagonal comb,

and the fact that in the South there seems to be a tendency for a nest to exist throughout a period of years seem to indicate clearly the steps by which the honeybees reached their present state of specialization.

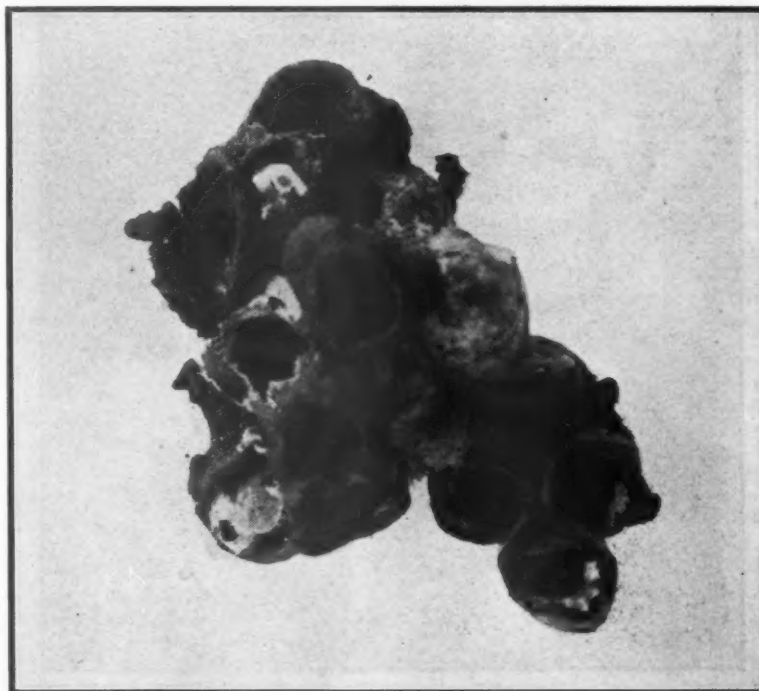
Data relative to the nest of bumblebees taken at College Station, Texas, September 10, 1919:

Number of field force	160
Number of bees in nest	170
Number of queens	7
Number emerged after the nest was taken	209
Number of queens emerged	52
Number of drones emerged	60
Number of old cells (1918)	205
Number of new cells (1919)	742
Number of cells used for honey storage	325
Number of cells used for pollen storage	126
Amount of honey, estimated	1 oz.
Total number of bees	539
Total number of cells	992

College Station, Texas.

Bumblebees and Smoke

In his article "A Bumblebee's Nest" in this issue, Mr. Parks asserts that smoke only provokes the anger of the bumblebees. This is contrary to the experience of the associate editor. I have found it possible to control both bumblebees and yellow jackets very nicely with smoke. By blowing the smoke freely into the nest before disturbing the bees, I can open the nest and manipulate the colony much as one would do with a colony of honeybees under similar conditions. While examining such a nest I have had the bumblebees crawl over me quietly and without showing the slightest trace of anger. I would suggest that Mr. Parks try smoke again under more favorable conditions and see whether he is not able to control the bumblebees as readily as honeybees.—F. C. P.



Bumblebees' nest, showing cocoons, honey and pollen cells.

Two Queens in One Brood-Chamber

By Dr. J. H. Merrill,

State Apiarist, Kansas State Agricultural College.

IN the spring of 1919, a queen was clipped in one of the colonies at the Kansas State Agricultural College. In the middle of August, on examining this colony, we found an unclipped queen. According to our records the old queen had been there on the date of the last examination. Thinking that perhaps this might be one of the rare occasions in which a young queen was working along in the hive with an old queen, I suggested that they examine the hive carefully with the idea of perhaps finding another queen, and another was found on the opposite side of the hive on the next to the outside frame. Both of these queens were laying queens, as was shown by the presence of young brood in the comb on which each queen was found. The first thought was that probably this was the old queen, and that she was being allowed to remain for a time with the new queen, but upon examining her it was found that she was not clipped. There were two frames of partially drawn comb in the center of the hive, which were evidently serving as an efficient queen excluder, at least enough so that both queens were working in the same brood-chamber.

An examination of this colony again three days later showed that only one of the queens remained, which was only to be expected, as the rather thorough examination of the hive would cause the bees to discover the fact that there were two queens in the same hive. The fact that the clipped queen was no longer present, and as neither of the queens which were found were clipped, shows that both of the queens were young queens. It would have been interesting to know how long they would have gone along in the hive-body if it had not been disturbed, but, of course, as we did not know there were two queens there, we did not try to use any extra caution in examining it.

Sweet Clover a Weed

RECENTLY I had occasion to examine a copy of Prof. L. H. Pammel's book on "Weeds of the Farm and Garden," a large cloth-bound book. I was greatly surprised to find that the author classes sweet clover with the noxious weeds. Here are some of the unfavorable references to sweet clover:

"In lists of weeds commonly found along roadsides, thistle, mustard, ragweed, burdock, sweet clover," etc.

In the Iowa seed law, "seeds of following weeds," include sweet clover (See Sec. 11, 1912).

"Sweet clover, one of the most

common weeds of pastures, etc., although occasionally useful in Iowa as a bee-plant, a soil renovator and a forage plant, we must nevertheless regard it as a weed."

"In New England and the Central States such weeds as dandelion, smartweed, burdock, sweet clover, etc., are all common weeds."

In another place he admits that "sweet clover is an excellent bee-plant, a good forage plant, and a satisfactory soil renovator."

It seems this book of Prof. Pammel's was published in 1912, so it may be that since then he has experienced a change of heart in regard to sweet clover, just as many others have been compelled to do during the past decade.

If sweet clover is such a dangerous weed as the accusations I have quoted would indicate, then isn't it strange that so many agricultural experiment stations would urge its wider cultivation? And, again, why should the sale of tons upon tons of sweet clover seed all over the country be permitted, if it is a weed?

In many of the best agricultural papers during the past two or three years the growing of sweet clover has been advised, and plenty of reliable testimony has been given showing its value for hay and for forage. Strange that a "noxious weed" should be found so valuable for so many purposes!

It would seem that it would be entirely in order for Prof. Pammel to correct his statements relating to sweet clover as a weed, unless his book has already been discarded.

For a quarter of a century I have been a booster for sweet clover, and have sold tons of the seed. I have urged its growing not only as a most valuable honey producer, but as a hay and forage crop, as well as a great soil enricher. It seems to me that a plant having so many excellent qualities as does sweet clover, is far from being a "common weed."

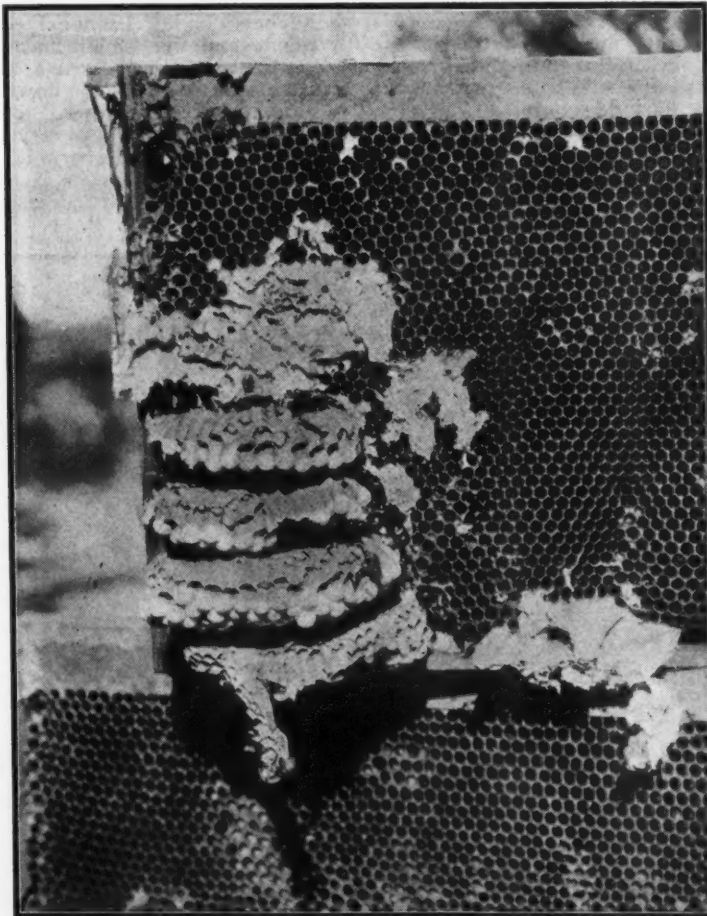
How about it, Prof. Pammel?

GEORGE W. YORK.

Spokane, Wash.

The editor has permitted me to see the above letter from Mr. George W. York. Let us remember the definition of a weed: A plant growing where it is detrimental to another crop. If that is true, sweet clover is a weed under some conditions, I say this advisedly. Sweet clover is, however, under other conditions, a most valuable plant, not only as a soil renovator, a forage plant, but a splendid honey-plant. The most reliable honey-plant we have in Iowa.

I would much prefer sweet clover on the barren hillsides and roadsides to a host of other plants. I advocate its planting. However, I have received frequent letters asking how to exterminate it. I have no objection to the planting of sweet clover in its right place. It should be planted. I want to say the same thing about the yellow sweet clover, which at Ames this year, furnished a continuous flow of honey for three weeks. It was better with us this year than white clover.



Part of the wax combs built by the bees had been removed and horizontal combs made of paper built instead.

Sweet clover is mentioned in the Iowa seed law because it sometimes occurs as an adulteration. I have asked that this be eliminated from the law.

The dandelion is classed as a weed. So it is everywhere in Iowa. I don't know what bees would do without it in May and June, and yet thousands of Iowa citizens would like to see it banished. It depends altogether on the special interest of the individual. In our work on honey-plants these weeds will be included as valuable honey-plants.

L. H. PAMMEL.

Yellow Jackets in a Beehive

By Frank C. Pellett

WHILE the writer was visiting at the apiary of D. W. Spangler, at Longmont, Colo., his attention was attracted to a hive where the flight at the entrance seemed unusual. There was a strong flight of insects coming and going, but upon examination it proved that the occupants of the hive were not bees, but yellow jackets. On the outside they had built a paper cover, similar to that with which they protect their hanging combs when built in the open. This extended about half way across the front of the hive, as will be seen in the photo.

There was some difficulty in making an examination of the interior. There was some question as to whether the yellow jackets could be subdued by smoke, and the nature of the paper nest made it difficult to remove the frames. With the lighted smoker, the writer approached the hive and undertook to subdue the insects as though they were bees. A liberal amount of smoke was blown into the entrance, then the cover was removed and more smoke blown across the frames. The results were entirely satisfactory, for the wasps made no attempt to sting, except in one instance after the nest had been



Beehive occupied by yellow jackets.

torn apart. A. J. McCarty and Mr. Spangler, both experienced beekeepers, stood by and witnessed the entire operation. It is hardly necessary to state that there had been serious doubt in the minds of the entire party as to whether these insects could be controlled by smoke. The usual explanation of the success of smoke in subduing bees, is due to the fact that they are induced to fill their honey sacs. Bees are generally quiet when their honey sacs are full. With wasps there was no honey to be had and a different explanation must be sought for.

On removing the frames it was found that a portion of the wax combs built by the bees had been removed and paper combs built instead. The honeybee's comb is made of wax and built vertically, while the combs built by the wasps are made of paper

and built horizontally. The differences are well shown by the illustrations.

Notwithstanding the fact that the wasps had built their combs inside the hive, where there was ample protection, they had surrounded them with the usual paper shell. This outer shell was largely broken up in removing the nest.

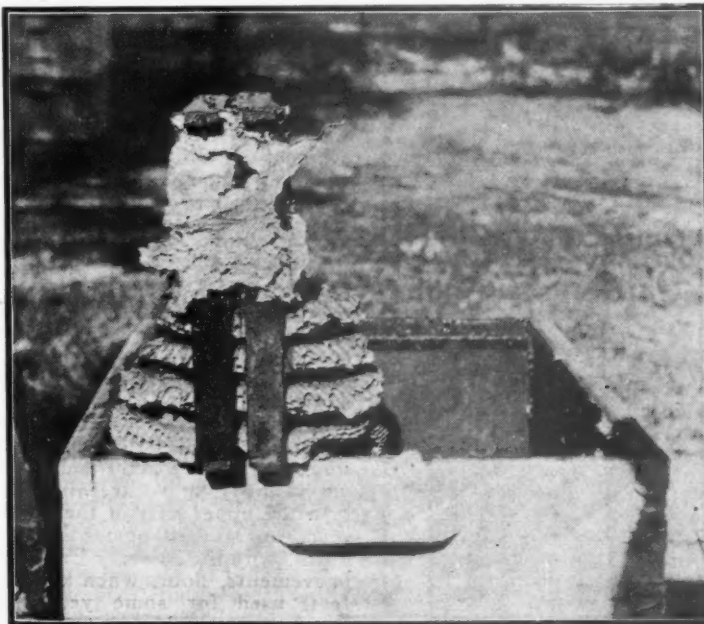
The cells of the wasps all open downward and the young are attached to the inside by means of a sort of appendage which keeps them from falling out. The nest was a populous one and hundreds of wasps were flying about while the nest was being examined and the photos secured. The combs extended across six of the frames and were four in number.

While wasps may occasionally be seen seeking nectar from flowers, their food, for the most part, is composed of animal tissue. Some species feed to a large extent upon house flies, others upon caterpillars.

Granulated Honey

By A. F. Bonney

A NUMBER of years ago I was stopping in the town of El Rio, Calif., and visited with a man near there who used to allow beekeepers to set their colonies of bees around his farm (ranch), where he raised vast quantities of lima beans. He got from the beekeepers one pound of honey per colony as pay for the privilege, and at the time I saw him had stored away some fifty cans of honey, which had accumulated, he not thinking of marketing it. This honey was granulated solid. He would cut out three sides of the top of a can loose, use from it until it was empty, then begin on another, and as he worked a force of five to twenty men during the year, there was a great amount of the sweet consumed. No one objected that it was granulated.



A horizontal comb extends across six frames within the hive.

Personally, I prefer the solid honey, both to eat and handle, and I believe the time will come when people generally will buy solidified honey as freely as they now do other forms, and that time will come accordingly as the granulated honey is advertised, and people educated; first, that the honey is pure; next, that it may be easily and quickly liquified; third, that it will keep indefinitely unchanged. Beekeepers know that it will be much easier to ship. There will be no leaking.

I think that if the beekeepers of the United States were to individually push granulated honey it would not be many years before we should have a fair trade in this commodity. I judge from my own experience, for I now have a few customers who come to me yearly.

Buck Grove, Iowa.

Hives—8, 10, 13 Frames

By Jes. Dalton

IN regard to the article by Mr. C. F. Davie, on page 344 of the October number, concerning 13-frame hives, I wish to say that I have used these "barns" for years, both in the North and the South. I have 140 of them in use in a 300-colony yard, side by side with both 8 and 10-frames. I wish to comment a little.

First, he says "they accommodate 13 frames snugly with one-quarter inch to spare," and he expects Dandant results with "a minimum of swarming." I never put over 11 frames in those hives, use full depth supers and space same above as below. I let the queen have the run of the hive. I follow the "let alone" plan and take out the solid combs of honey. I do not try to take the honey off by the super full.

He speaks of the queen leaving 4 outside frames of foundation untouched. I would have been surprised had she done anything else.

I find 4 or 5 frames of foundation together to be the best thing to make a queen leave the broodnest for the super, and vice versa, wherever those 4 or 5 frames are, if all in a bunch.

But I think Mr. Davie struck the meat in the cocoanut when he reported his wife's statement that it was "the largest swarm she has seen." Those barns will get them for us.

I think we all have a lot to learn about swarming yet, and also about the size and shape of hives. For instance, it is commonly accepted that "old queens cause swarming." But how about a young queen in a little hive, hot and full of brood and honey?

In June my 8-frames got to swarming and over 20 swarmed before I could check it. Some swarmed three times. But out of the 140 "barns," in the same yard, I got 2 swarms. Same yard, same weather and all, except that I had gone through the eights every 8 or 10 days, cutting out queen-cells and giving ventilation, etc., while I did not have time to go through the "barns" for nearly two months.

I have come to the conclusion that hives are like a lot of other things. You cannot get perfection, and often have to choose the lesser of two evils.

Those big hives are expensive to make and heavy to handle when full of bees and honey. But when run on the "let alone" plan and as non-swarmers, I find them the best I have tried yet.

Eight-frame hives are nice to make, cheap, and easy to handle. But there is something about a tall, narrow hive full of bees that makes them swarm worse than a wide, roomy hive. I prefer 20 frames in 2 stories to 21 frames in 3 stories.

I requeen one-half to two-thirds of my colonies every year, carrying over only my best queens. In looking for

preparations for swarming, I notice the behavior of the bees at the entrance, the loafing, the excess of drones, etc.

As soon as a colony needs it, I block up the super with a little stick, for ventilation. If the hive sets much in the sun and is strong, I even block up the cover, for I consider swarming about the worst thing that happens in the apiary.

Bordelonville, La.

The Use of the Truck

By E. F. Atwater

IN these days of rapid transportation, the beekeeper who can reach his yards with a car or truck, and does not do so, is becoming rare, and probably is not conducting his business in the most economical and efficient manner.

Among the favorite means of transportation the Ford stands first, because of low cost and economical upkeep. However, it is the writer's conviction that many beekeepers using the small car with small truck body, which, without overloading, cannot carry much of a load, might more economically do more work by investing a little more money and have a hauling capacity of 1,500 to 3,000 pounds per load.

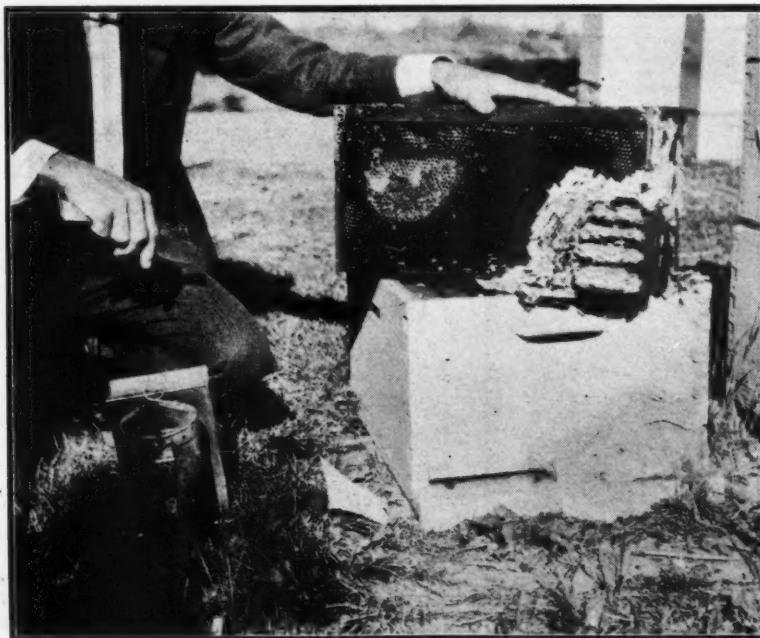
We use a substantial small truck, carrying easily 1,500 pounds, and, when needed, a trailer which carries nearly as much more.

The light truck carries quite a load when needed, and, being equipped with pneumatic tires, makes nearly as good time on the road between yards as a touring car, but in moving bees or hauling in the honey from our ten yards, we do need more capacity.

Our friends at Parma, Idaho, Messrs. H. M. West, H. E. Crowther and Irvin F. Powers (the Parma Bee and Honey Company), use one or two small cars for quick trips to yards, and for the heavy hauling, a Ford with one of the ton or ton and a half truck attachments, and a large body, 7x9 feet, as shown in the cut.

These truck attachments are of several makes, chain, worm or internal gear drive, and cost \$360 and upward. The tires on the heavy rear wheels are solid, eliminating one cause of trouble. Such a re-built Ford costs more than the little Ford ton truck, but the chassis and frame are, I believe, longer than that of the regular Ford truck, and, most important, the springs are very long, easy riding, semi-elliptic, while the springs on the regular Ford are short, unyielding, and reported to be anything but satisfactory for hauling anything as fragile as foundation in frames and sections, or honey in sections or in large combs to extract, unless roads are good and one drives very slowly and carefully.

In the upper part of the cut will be seen the Metcalf portable extracting outfit, with the Atwater-Crowther improvements, floor, when down, 12x16 feet, used for some years by the Parma Bee and Honey Co., and about the same as ours. In this connection



A paper shell was built around the combs inside the hive.

the writer is convinced that, desirable as is the large floor space shown in this portable extracting house, more desirable still is the ability to drive right into a yard and get to work in the minimum of time, which cannot be done with a room, any part of which must be unfolded or set up on arrival, and taken down or folded when ready to move to another yard. The best size for a portable, considering all these points, is 8, 9, or possibly 10 feet wide, by 16 feet long.

The writer has seen one portable 10 feet wide, and aside from a little difficulty in getting into gates, and in passing teams on the road, the size is very satisfactory.

However, after years of use of a permanent outfit, our friends have arrived at the same conclusion as the writer, that where yards are not too distant, the better plan is to haul all combs to a central plant, where everything is convenient.

With the central plant, extracting can go on, as it did with us at one time last summer, when the weather would have entirely prevented the use of a portable, as we used escapes to remove the honey in an all but Arctic spell of weather.

Meridian, Idaho.

Water in Shipping Bees

By A. E. Lusher

HAULING bees and shipping bees from one place to another is no small side issue if followed up year after year in a large way. Bees need water if shipped on cars any distance. When shipping bees on cars a long distance I would prefer to use a can about the size of a corn can, with the same kind of moss that they use in a nursery for ferns, put in the can, then fill half full of water. Take out enough frames so the can may be tacked in the corner of the super, then put on the moving screen. The bees will get the water from the moss and will not drown or be wet. If more water is needed, the can could be filled through the screen. It doesn't matter if they do get a little wet on a car, for they don't get the awful jarring and bumping a large truck gives them. Even in California, all roads are not boulevards, by a long ways, and the bees are in an awful uproar all the trip, from bumps and chuck holes.

I have tried many good ways of giving them water, but find that if they are not closed up too long they will be better off without the water. When the combs have fresh orange honey in them and you have bad roads, it will shake out on the bees and stick them all up so they suffocate while moving.

We try to move them just after they are extracted, before they get in any of the new honey, for they are lighter and the new combs don't wire-cut if the weather is warm. You may wonder why we start moving before the honey-flow is over, but by the time the last of the honey is over we have all the bees in another flow. I have tried filling a comb with water, but it shakes out

on a rough road just like the new honey does. Methods and locations differ greatly. What works in one place may not work in another.

Pasadena, Calif.

(The editor believes that water is necessary only when the bees have brood, or when they are fed with dry candy. Fresh honey should be sufficient to supply their needs with the brood. We invite comment on this question.—Editor.)

Fertilizing Drone Eggs—An Experiment

By Gilbert Barratt

THE statement by Dieckel in Germany, and Simmins in England, that queens lay nothing but fertilized eggs, and that in the case of eggs laid in drone-cells the fertilizing element is removed by the workers, led the writer, in view of later investigations, to prove, or disprove this theory.

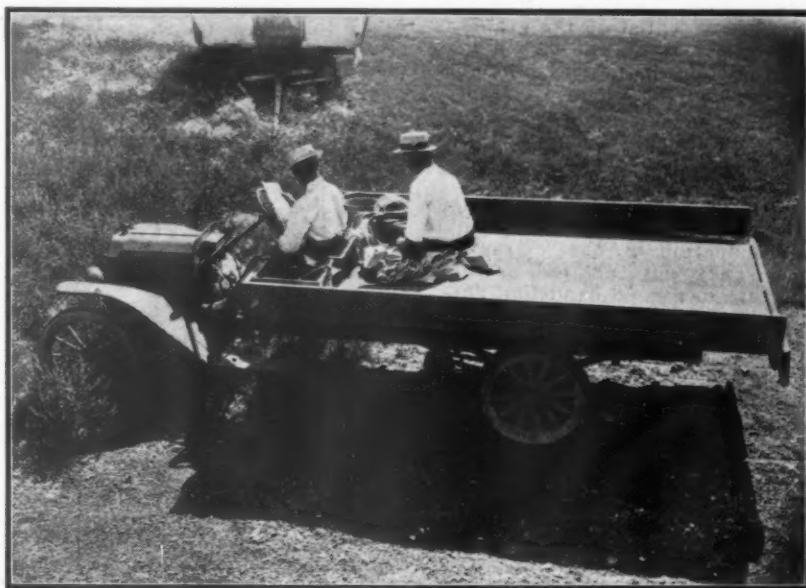
A frame of drone-comb was placed in the middle of a strong colony, and the following day was examined. Fortunately, the queen was found in the act of laying in this comb, and immediately she had withdrawn her abdomen, the cell was closed with a pen-knife, thus preventing any worker touching the egg. Four cells were closed in this manner, the piece of comb cut out and placed in an incubating chamber running at 97 degrees. The next day a little royal jelly thinned slightly with new honey was placed on each egg with a hair pencil. These eggs duly hatched, were further fed until larvæ were two days old and were then transferred to artificial queen-cups; they were then given to a colony that had been deprived of its other combs being given from above an excluder. They were all accepted and on opening were found to contain dead drones. This experiment was very carefully conducted, and not the slightest opportunity given of allowing any bee to touch the eggs until hatched and larvæ two days old.

The investigation in view, providing the above theory was disproved, was to fertilize drone eggs. Freshly laid drone eggs from a pure golden Italian queen were secured, the comb containing them cut down, and pure Punic drones just arriving in the hive, after a flight, were squeezed over the eggs, in the hope that a spermatozoon would enter the micropile of the egg, and thus fertilize it. The reason Punic drones were chosen was to provide as great a contrast as possible, seeing that the Punic is intensely black and possesses several distinctive features. The queen chosen for the eggs was one producing the lightest and yellowest bees. These eggs were then treated exactly as in the foregoing experiment, and produced extremely dark queens, considerably darker than leather colored Italians. Several queens duly mated, some to yellow, and some to black drones, but nearly all workers showed unmistakable evidence of Punic blood. Drones returning from flight were selected because the air sac being distended, the expulsion of the male sperm was facilitated.

The eggs of a mismated pure golden queen were the subjects of the next experiment, and pure golden drones used; these produced bright golden queens, and finally, the eggs of a drone-laying virgin were tested in the same manner, these also producing queens exactly as in preceding experiments. We therefore have the anomaly of pure queens from a mismated mother, also queens from a virgin.

The value of these investigations, apart from its entomological interest, lies in the fact that all queen breeders, who are building up a high-class strain, can **definitely** introduce any given blood into that strain, and, owing to the comparative simplicity of the process, should interest all queen breeders.

The writer was not successful in fertilizing eggs from Italian fertile workers, nor was the experiment successful when using eggs nearly due to hatch. The age of the eggs may be



Atwater's truck.

easily determined by their position in the cells, a newly-laid egg being stuck point downwards, and gradually leans over until the third day, when it is quite flat. It will be interesting if Dr. Phillips or Mr. Pellett will try this out, and give the results of their investigations.

Sheffield, England.

(Parthenogenesis is no longer a theory, because it has been proven so many times over. But the above experiment is interesting, nevertheless, because it gives us a new idea, something which we believe has never been tried before, or at least never recorded. Fertilizing drone eggs in this manner looks plausible, at least for the sake of experiments. We trust our investigators will give it a fair trial.—Editor.)

Temperature and Nectar Secretion

By Kenneth Hawkins

THAT high night temperatures are not conducive to the secretion of nectar by honey plants, is indicated in the data collected at Watertown, Wis., during the summer of 1919, from a careful study of honey plants, by the G. B. Lewis Company's apiary and the records of the U. S. Weather Bureau here. Scientists know that relatively low night temperatures with considerably higher day temperatures are valuable to enable many honey plants to effect the change of starches to sugar within their systems, preparatory to nectar secretion next day. The temperature effect in slowing down nectar secretion in white clover, raspberry, basswood and sweet clover, in the order named, is noticeable.

On the graph accompanying this article, the heavy line (see Note 1) shows the gradual increase in the mean daily temperature from May 1, 1919, to July 31, 1919, beginning at 52 degrees F. and ending at 75 degrees F. The dotted line (see Note 2) represents the storing strength of the colonies, which arrived as 3-pound packages from Texas on May 7th, the date represented on the graph as A. The point B, on the dotted line, shows June 6th, the first day the bees began work in the supers. C. represents the peak of storing of surplus, and D. the greatest decline registered on July 31st. The bees were released on brood-frames with full sheets of medium brood foundation and the colonies had to draw out thin super foundation in the extracting frames. They were not fed, as they arrived here in a good dandelion flow. Note that the point L., on the top horizontal line (see Note 4) represents the date when the first white clover bloom appeared, and M. the date of the first raspberry bloom, and N. the date of the first basswood bloom. O represents the first sweet clover bloom. The heavy graphs, N. Y., and Z., (see note 3), represent the relative rainfall for the three months, May, 2.45 in.; June, 1.49 in., and July 4.00 in.

Blooms Last—Nectar Stops

The writer wishes to emphasize

that sweet and white clover remained in bloom long after the bees stopped storing surplus honey and that sweet clover was still in bloom here August 27, with the bees working on it heavily, but with no signs of the nectar in the supers. Please note that the heaviest rainfall of the months was in July, cutting off the drying-up theory relative to the failure of the honey plants to yield nectar. Robbing began to be noticeable here August 1, and the bees have since placed no surplus honey in the supers.

This indicates that something other than the condition of the bees, the rainfall or the number of honey plants affected the cessation of nectar secretion. The writer believes the cessation is due to the constantly increasing mean temperature, which was particularly noticeable at night.

The following table is of interest:

- May 7—Bees here.
- May 10—First eggs noted in frames.
- May 26—First white clover bloom.
- May 28—First red clover bloom.
- June 6—First colony begins in super.
- June 9—Locust blooms.
- June 9—Raspberries bloom.
- June 17—Heavy flow from white clover.
- June 20—Basswood buds begin opening.
- June 21—First sweet clover bloom.
- July 3—Bees desert basswood.
- July 15—Last supers on filled slowly.
- August 1—Bees robbing badly.
- August 10—Sweet clover, toad flax, goldenrod, red clover, dandelions bloom.
- August 27—Bees still robbing badly on opportunity.

Explanation of Graph

- I.—Heavy line shows average mean temperature increase from 52.9 degrees F.
- II.—Dotted line shows: Arrival of bees at A. (May 7); begun super work at B. (June 6); peak of storing at C. (July 15), and robbing at D. (August 1).
- III.—Heavy graphs represent comparative rainfall for the months of May, June and July; May, 2.45 in.; June, 1.49 in.; July, 4.00 in.
- IV.—Dates marked on the top horizontal line marked to indicate the beginning of honey-flows from: L.—white clover; M—raspberry; N—basswood; O—sweet clover.

V.—Daily night temperatures not shown for lack of space. Daily mean temperature increase adopted since complete figures show daily increase in night temperatures, which are relative.

Watertown, Wis.

What Beekeeping Offers for Disabled Soldiers

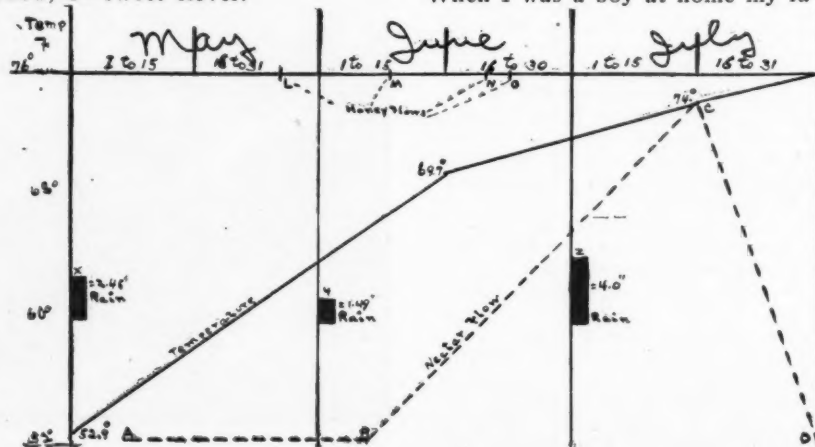
By Frank R. Townsend

Vocational Educational Student, Kansas State Agricultural College

THE question of securing employment for disabled soldiers is one that would ordinarily cause a great deal of concern and no little worry to the men themselves. However, since the creation of the Federal Board of Vocational Education, the solution of this problem has been greatly simplified. I am one of these men, and wish to say a few words as to the benefits I think I am going to receive from this work.

On the 28th day of September, 1918, I was struck by a machine gun bullet, which caused a compound fracture of my right leg. After the wound was healed the leg was shorter than before the injury. I do not believe that a man is crippled unless the injury is in the head, or, in other words, if he has any ambition there are great opportunities open for him to obtain an education, and fit himself for business. Even though a man may be so disabled that he cannot do all of the heavy work about the apiary himself, yet, if he understands the nature of bees well enough, he will find beekeeping will pay enough income so that he can afford to hire someone to do the heavier work for him whenever necessary. This is especially true in the case of a disabled soldier who has an opportunity of taking advantage of the education offered by the Federal Board of Vocational Education. I am taking advantage of it myself, and attending the Kansas State Agricultural College at Manhattan, Kans., where, since the first of May, among other studies, I have been taking beekeeping under Dr. J. H. Merrill, and have become greatly interested in what this beekeeping business holds as a future for disabled soldiers.

When I was a boy at home my fa-



ther kept a few colonies of bees and handled them for comb honey. Although his hives and tools were of the crudest sort, and the price usually obtained for comb honey at that time was only 10 cents per section, he made a small profit from them. My portion of the work was to put the sections together and fasten in the foundation with a Parker Foundation Fastener. Since taking up the study of beekeeping, I find a great deal of difference in what used to be considered necessary for the keeping of bees, and what I now know to be the real necessity, that is, a thorough knowledge of bee behavior. Father's knowledge of bee behavior was limited. During the winter we made up the sections. In the spring we put them in the hives, and in the fall, if any of them were filled, we removed them. The questions of increase, swarm prevention, requeening, improving our stock, etc., never concerned us in the least.

I do not believe it will take a great deal of capital to make a start in the bee business, providing one begins with a few colonies and gradually makes his increase. By making a small start, I believe that a man can get greater knowledge of bee behavior, and, consequently, know what to expect from his bees at all seasons of the year better than he could if he started in with a large number of colonies, without having experience or knowledge to handle them. Here at the college we get practical experience in beekeeping. They have a good many colonies, and our class work consists of handling and caring for these colonies. Ever since last May we have been engaged in actual handling of the bees, trying out different methods, so as to learn how the bees would act under different conditions, and I think that we have made a very good beginning along the road of better beekeeping.

After spending so much time in France, where I had an opportunity of watching the people get good results from small pieces of ground, I feel that now I could take a much smaller place and make more money from it than I could before I went over there.

I am planning on combining poultry raising with my bees, and I believe that, even though I may be classed as a disabled soldier, the chances for making good in this world have not been withheld from me.

Criticisms

By C. E. Fowler

ON page 267 F. R. Smythe says: "In my opinion the primary cause of swarming is a preponderance of young bees in the brood-chamber." And on page 271 G. C. Greiner says: "It is the old stock which is bent on swarming; young worker bees the same as young queens are less inclined that way." Who is right?

Beekeepers seem to have so many different ideas as to what causes and how to prevent swarming that a new

beginner is fairly dazed and works overtime trying to follow them all.

I would like to suggest that they are both wrong and will try to prove it by saying that in my system of swarm prevention, which worked 100 per cent this year, I paid no attention to old bees or young bees to keep them either in or out of the brood-chamber. I might also mention that the large hive advocates do not make any provision for keeping either young or old bees out of the brood-nests. At least one of them must be wrong.

Then I think you are overworking Dr. C. C. Miller, making him answer so many "Tom-fool" questions asked by new beginners who are too poor to buy a bee-book and are just getting the fever and want to know it all at once. Look at "Miscellaneous Questions," page 278. 1st, "How much profit can be made out of one colony of bees?" 2nd, "How many colonies can one man tend?" Iowa has the fever badly and wants to make money on paper, as quickly as possible.

On page 277 the Doctor has again made the mistake of saying carbon disulphide will kill eggs of the moth.

(I have been asked where I got the authority for saying that carbon disulphide would kill the eggs of the bee-moth. I don't know. I think that wherever I first read of this drug as a good thing to destroy the larvæ of the bee-moth, it was stated that it had the advantage over the fumes of sulfur that it would kill both eggs and larvæ. I had a lot of combs in which the bee-moth had begun its work. I treated them with carbon disulphide, and found no occasion for a second treatment. If I had used sulfur I should have ex-

pected a second crop of larvæ from eggs not destroyed. Still there is a possibility that in that particular case all eggs had hatched before treatment.

Turning to the books, I don't get much light. Some of them are silent as to the eggs. One of them speaks of using the fumes of burning sulfur "to kill the eggs or worms of the moth." (I'm pretty sure that's a mistake about the eggs.) Another says that when the larvæ are killed by sulphur, "eggs also are, at the same time, destroyed." Another says the eggs are usually not destroyed by fumigation. So there you are.

Who can offer satisfactory proof either way? If one failed to kill eggs with carbon disulfide, is it certain the dose was heavy enough? If one fumigated and had no eggs hatch after, is it certain any eggs were present? Help!—C. C. Miller.)

I would like to tell "Alabama" (last answer, page 378) a good way to transfer 10-frame standard to Jumbo. First, nail a seven-eighths piece of wood on the bottom of the standard frame, making the frames the same depth as the Jumbo, and put them right in the Jumbo hive, and the job is done. Then by the aid of full sheets of foundation and a good honey flow get the queen on the Jumbo frames and the standard above an excluder, and when filled with honey extract and melt the old combs, which would never be satisfactory left in after cutting and transferring the old way.

But why change to the Jumbo? On page 274 Arthur C. Miller says of the long-idea hive: "They are great, unwieldy things," which applies equally to the Jumbo.

The easiest of all ways to handle bees is to use the standard 5 11-16 extracted honey super for brood-nest and all, making everything standard and interchangeable.

The two magic words of beekeeping are "standard" and "interchangeable."

Hammonton, N. J.

(We trust our correspondent will forgive us if we say that we find no contradiction in the statements of Messrs. F. R. Smythe and G. C. Greiner. The "primary cause of swarming is a preponderance of bees," and of course it must be young bees, since a colony increases only by hatching of additional bees. But "it is the old bees which are bent on swarming," owing to that very preponderance which causes the hive to become overstocked. So these two writers agree and are both right.

But there is no need to make provisions to keep either young or old bees out of the brood-chamber, if there is an adequate amount of room.

As to overworking our Dr. Miller, we believe our correspondent is right. Too many questions are asked which one would find answered in the books. But if we were to leave out all the questions that may be found answered in the books, the department of Dr. Miller's Answers would be very small. The intention is to give information to beginners,



A returned soldier takes up beekeeping at the Kansas College.

and incidentally to some experienced apiarists.

Mr. Fowler wants beekeepers to use only shallow bodies for both supers and brood-chambers. He is not the first man to advise this. The Heddon hive was made of shallow bodies, so was the Danzenbaker. Other people want all full depth Langstroth bodies, both for brood-chamber and supers. We have never found it advisable to use the same size in brood-chambers and supers and do not believe that the use of shallow supers with full depth brood-chambers is any more objectionable than the use of sections on full-depth bodies. We can, even then, say that our implements are "standard and interchangeable."—C. P. D.)

Wire Kinks

By F. B. Richardson

IN the May number of the American Bee Journal, Mr. J. E. Crane makes some very interesting and timely remarks about foundation and its sagging. Every extracted honey producer, particularly in a warm country, has at some time had experience with the sagging foundation proposition, in spite of all possible care—as he thinks.

From our experience, the thickness of the wax has less to do with the sagging than the wiring. Before the days of pierced frames we used to be very careful to pierce the frames near the top bar, no matter how many wires we were using, but when the frames came pierced it not only saved a lot of work, but the manufacturer had evidently had experience, as they were pierced quite high up, near the top bar. All the frames we have used have been pierced to take four wires, and this number seems to be the most generally successful, three not being quite enough to avoid large spaces between the wires, and five being a waste of time

and wire, with no added advantage.

The method of wiring by simply threading the wires through the holes, then tightening until they "sing," has not proven the best method with us, as the wires are bound to slacken by drawing into the wood, with the result of bulging combs, sometimes in three or four separate bumps, or the top tears out or the middle caves in, making very poor combs for any purpose. We have tried wire at all distances and nearness to both top and bottom bar, but with always the same result, so long as the wires are simply threaded in as above.

Happening into a supply dealer's one day, and having to wait some little time, an investigating tour of the premises discovered some frames in process of wiring by an entirely new method, and one that looked very reasonable. No. 3 fine or lath nails were inserted in the holes in the frames and the nail curved into a hook on the inside of the frame with a pair of round-nosed pliers. The little hooks are made so the wire just slips under easily, and with a little practice they can be turned out at a lively rate. The wire is threaded around these hooks and then drawn tight. There is absolutely no "give" to the wires done this way, the only necessary care being not to draw in the sides of the frame so as to spring it out of shape. We wind the wire on itself to start with and finish it the same way, using an electrician's twist. If wound correctly there is no danger of its ever pulling out.

Another thing we have found of importance in avoiding sagging wax is the size of wire to use. We used to buy No. 30 tinned wire by the stone, but now we buy No. 26, as it does not break nearly so readily, is easier to imbed and holds its position better, being heavy enough to support the wax without sagging. In

fact, we have never had a sagged comb since using it, and we have hundreds of them made over this sized wire, held by the hooks and filled with light brood foundation.

As there is a considerable saving of wax by the use of the light instead of the medium or heavy brood, and the combs stand the wear and tear of extracting as well as any we have ever used, we can see no advantage in the extra weight through the center.

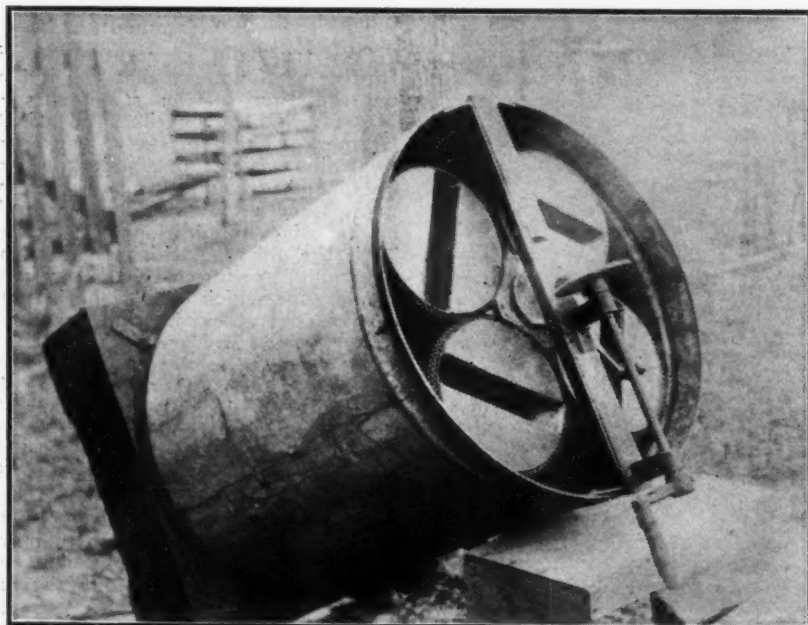
In buying a yard of bees we sometimes come across some very novel, not to say peculiar, things, but the strangest thing to me has been the many systems—or lack of systems—of putting in foundation. We found one idea not long ago which was really funny, or would have been if it hadn't been a little pathetic, where a man had wired his frames from corner to corner for **extracting!** It might be a bit of improvement on no wiring at all, but very little, I'm afraid, for this climate. One of our neighbors does not believe in wiring at all, as he is thoroughly convinced that his comb would melt down in the hive, his theory being that the wires attract heat. There is an old saying that "it takes all kinds to make a world," and sometimes we do not have very hard work to believe it.

Hughson, Calif.

A New Honey Extractor

The extractors now in use have some serious drawbacks. The most serious of these is the damage to tender combs when extracting for the first time and the necessity of stopping the machine to reverse. A machine has been invented by T. W. Livingston, of Georgia, which overcomes both these difficulties. The cause of breakage of new combs is frequently the heavy pressure from throwing out the honey from one side while the honey still remains on the opposite side of the comb. Mr. Livingston's extractor can be reversed several times while the machine is in motion, thus doing away with the necessity of stopping or slowing down the machine. This being the case, it is possible to reverse it frequently while the combs are being extracted, thus throwing out a small part of the honey from one side and reversing to throw out an equal amount from the other side, thus equalizing the pressure and removing the honey gradually.

With the machines now on the market the baskets are hinged on one corner, thus throwing the basket clear around with a bang when it is necessary to reverse. The Livingston machine is pivoted under the center of the bottom of the basket and it is reversed by swinging it around on its pivot. Instead of being necessary to reverse the baskets in an opposite direction from that in which the reel is revolving, this machine reverses by simply making a half turn in the same direction. It is possible thus to reverse as frequently as desired without checking the motion of the ma-



Livingston's extractor.

chine. The baskets always turn in the same direction. We are showing two pictures herewith, which will give a good idea of the construction of the machine. The one shows the top view of the baskets and the gearing. The other shows the complete machine.

The movement of the earth on its axis as it revolves around the sun furnishes a good illustration of the way the baskets inside the extractor turn on their pivots, while revolving around the inside of the can. Mr. Livingston has extracted thousands of pounds of honey successfully with this machine. He first described it in this journal in 1909. The same machine has been in operation in his apiaries since that time, so that it is safe to say that the principle is correct and beemen may hope to be relieved of the annoyance of the breakage incident to reversing with the old style extractor.

Punics or African Bees and Parthenogenesis

THOSE of our readers who have read the editorial on the above subject and the Baldensperger article on the same matter in the November, 1918, number of the American Bee Journal, will remember that the question raised is whether any Punic or South African worker-bees have a capacity to lay eggs that will hatch and produce perfectly developed females, without previous impregnation.

The quotation which we made, from the "Western Province Bee Journal," on this question, convinced us that its editor, Mr. Attridge, is entirely disinterested and impartial in this matter. So we wrote him to ask his opinion. He replied in a long letter, from which, with his approval, we quote as follows:

"From my own experience I can say that it is quite a common thing for our South African queens to take wing during manipulation while the hive is open. Unless great care is taken, it is easy for a queen to enter a super or to settle in a small cluster anywhere and enter a hive.

"I have experimented with several colonies regarding 'worker-laying workers,' but my results have been negative. In every instance I have failed to produce workers from workers, although the Rhodesian Entomologist considers Mr. Onions, who conducted experiments under his supervision, to have proved his claim that they 'produce females without male impregnation' and that this 'appears to be the rule to which male development is the exception.'

"It is generally believed that only one queen is allowed in a hive at one time. When inspecting colonies in Johannesburg (for European foul-brood), I found, in one hive containing bees, brood and stores, no less than six young and active queens, besides some sealed queen-cells. I was struck with the number of queen-cells in nearly every hive opened in that part of the country.

"Three years ago I raised three

queens at the same time in an observation hive. One of them was slightly small, but she mated successfully (indicated by the presence of the genital organs of the male), and became a worker-laying queen. The other two were scarcely larger than an ordinary worker. One of them lived about a month and then disappeared. The other one lived in the hive for 5 months. Although such queens would be difficult to find in a populous colony, I had no difficulty in picking her out from among the workers in the observation hive on account of her shape. When seen enlarged through a hand lens, she looked a perfect queen. She was shy and preferred the dark places on the top and edges of the comb. Sometimes she would wander on the face of the comb and deposit eggs in the cells surrounding the brood patch. All of her eggs which I marked disappeared in 24 hours. They were no doubt removed by the workers. I believe they were drone eggs and as drones were apparently not required, the bees would not rear them. If, by any chance, the worker-laying queen came near the supposed drone-layer, the latter fled as fast as possible. She was also sometimes worried by the workers. This is the only time I have observed workers worrying a queen, even though there were more than one present in the same hive. The distance from the inside of the hive to the outside was 3 to 4 feet.

"Do fertile or laying workers work in the field the same as ordinary workers until such time as they assume the maternal instinct, or do they remain in the hive to be fed and treated as normal queens? I should believe the latter.

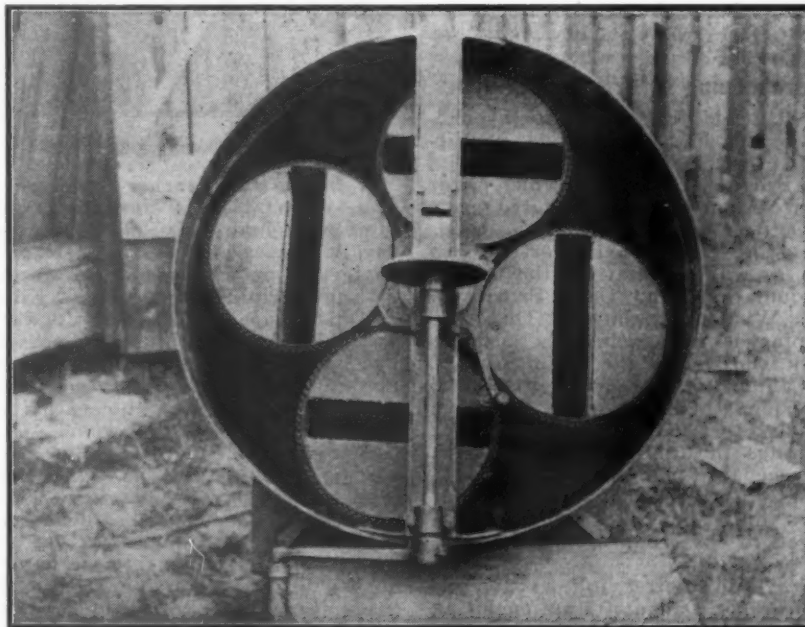
"There is no difference in the egg which produces a queen or a worker. Special feeding produces a queen. This was proved by Huber, who fed worker larvae with royal jelly, and when emerged he painted the thorax and amputated the right antenna. He

afterward caught some of these workers in the act of ovipositing. He wrote: 'I have repeated the experiment so often, and weighed all the concomitant circumstances with so much care, that whenever I please I can obtain fertile (laying) workers in my hives.' The perfect queen is capable of mating. The laying-worker is considered to be incapable of mating, yet she is credited by Mr. Onions with power which it is generally believed is denied to the perfect queen. If the worker can generate workers, why does nature give them a queen or mother-bee, without which no colony can survive? The fact that the ancient Egyptians of the 12th Dynasty used the figure of the queen-bee to denote sovereignty shows that thousands of years ago the honeybee had evolved to the stage of a queen or mother-bee for the colony. It seems remarkable that this bee retains what may possibly be considered the original type, i. e., each female perfect and able to reproduce her kind.

"As far as I can gather, Mr. Onions makes no mention of unmated African queens possessing the power of producing worker-bees.

"Is a perfect unmated African queen able to produce both workers and drones? If not, why should a laying worker be able to do so? This has an important bearing on the subject. Mr. Onions used what he described as 'African bees.' These he obtained from near Cape Town, where no pure race may be said to exist, where in past years scores of colonies, English, Carniolan, Italian, etc., having been imported and acclimatization attempted. In his own apiary, at the Cape, he had an Italian as well as an African.

"Hewitt writes of using Punic bees, a bee found in North Africa. Taylor, writing of the Egyptian, i. e., a North African bee, says: 'They possess two striking peculiarities—the first that they never use propolis, but substi-



Top view of Livingston extractor.

tute wax; the second, and a still more surprising one, that they appear to be accompanied in every colony by a fourth order of individuals, consisting in about a dozen of what may either be lalled fertile workers or drone-producing queens, but differing from either of these classes as we find them with other bees, as they are like queens in form, but smaller, and are marked, as are the drones that they and they only produce, by a yellow spot upon the breast.

"Mr. Onions' latest experiments were carried out in Rhodesia with bees imported from the suburbs of Cape Town. Some of the bees were sent him from near to where his late Cape apiary was situated. What is our 'Cape bee?' One would have thought that a bee of purer African race would be found in Rhodesia; a Punic or Egyptian bee having worked its way down. Mr. Onions does not claim to be able to demonstrate **worker-laying workers** from the native bee found in Rhodesia, but from the hybrid bee from the Cape.

"I know of only one man here who claims to be able to repeat Mr. Onions' experiments, and he acknowledges that the colony does not prosper, and finally perishes through weakness.

"I think we need to better understand the factors which govern sex in mating. In this we are told that there are certain laws which, like those of the Medes and Persians, are unalterable, and it is a question whether, in face of these laws, it is possible for an egg from a fully developed and mated queen, to produce either a **worker-laying worker** or only a drone-laying queen, simply by the difference in the feeding of the larva after the egg—in which are wrapped unalterable laws determining sex—has hatched.

"What we speak of as the 'Cape bee' is not a pure race, but a hybrid. Bees of various colors and stripes and characteristics are found in the hive at the same time. We have yet much to learn about the 'Cape bee.'

"ALF. J. ATTRIDGE."

Beekeeping in British Columbia

OUR old friend and correspondent, F. Dundas Todd, of Victoria, sends us an account of the Provincial Fair, in which three tons of honey were exhibited early in October. It seems that the ladies are doing considerable work in this line, as will appear from the following quotation in the "Daily Province:"

"A Woman Exhibitor.—That beekeeping is not exclusively a man's work is proved by the exhibit of Mrs. McCallum, of Delta, whose display of 300 pounds of honey products gained the first prize, and combined with winnings in other classes, won the gold medal of the exhibition.

"Mrs. McCallum has kept bees four years only, but in that time has forged to the front in this interesting profession."

Mr. Todd's letter follows:

"Dear Mr. Dadant: I am enclosing a readable account of our beekeepers' exhibit at New Westminster Provin-

cial Fair, which I suspect was written by our President, J. H. Winson, a man who turns many a delightful phrase with a facile pen.

"Five years ago I judged the honey at this exhibition. The whole exhibit could easily have been staged on a common kitchen table. The great war brought a cessation of activities in agricultural exhibitions in British Columbia; now, with happier times, they have resumed. The contrast between 1914 and 1919 gives a rather good measure of the advance our province has made, even with the din of warfare sounding in our ears, and the absence of our boys, who were long in deeds but mighty short in claims.

"Our women folks minded the boys' bees, as they did so many other chores, and they did the work well, as you will see from the article. One of them, Mrs. McCallum, simply

swept the decks in almost every class, and I want to assure you she is a real beekeeper, doing every bit of the work herself. Furthermore, I want to say I know dozens more just like her in British Columbia.

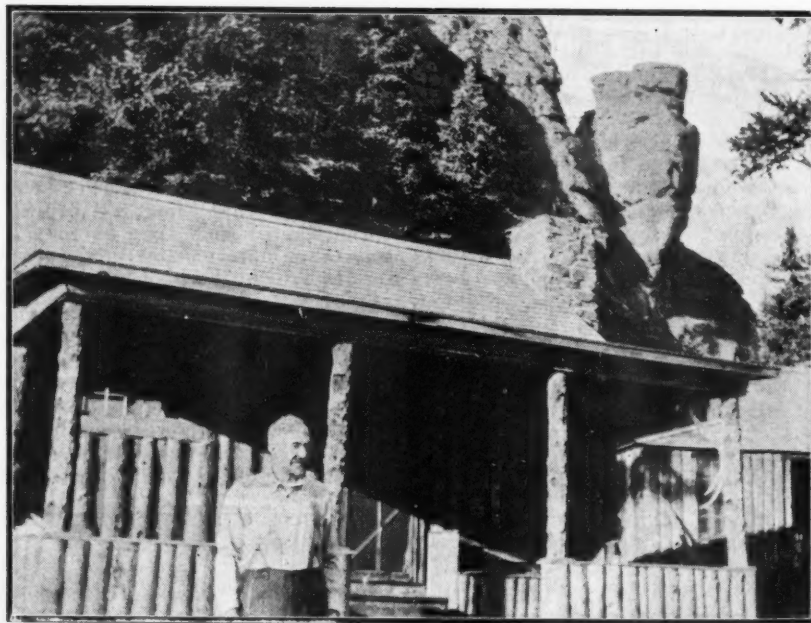
"Our crop, on account of the dry season, is very spotty, but we expect the total to show a decided increase, due to the enthusiasm now prevalent all along the line. These and other matters will probably be dealt with later on.

"I have worked my own apiary over into the Dadant style of hives, with only one modification, I used the Jumbo frame. It is the easiest handled hive I ever tackled, and I have about run the gamut. The transfer of 39 colonies cost me some money and a lot of work, but I don't think I will ever regret going through it all.

"Yours sincerely,

"F. DUNDAS TODD."

BEEKEEPERS BY THE WAY



A teacher of Agriculture who is a beekeeper, fruit grower and gardener.

A Successful Teacher-Beekeeper

D. W. Spangler, of Longmont, Colo., is no eight-hour-a-day man. He does two days' work in one. As a teacher of agriculture and science, he does a full day's work in the school room, and later does another day's work with his bees or in his garden. He has been known to rise at 4 o'clock in the morning in order to do a half day's work at crating honey before time to go to the school room.

Spangler is a delightful fellow with a genial, winning personality, just the type of man needed in school work. Sometimes teachers of agriculture are sneered at as impractical, but not so Spangler. He makes more money out of the day's work he does in his garden and with his bees than he does from the day in the school room. Fact is he is reputed to make nearly

double from his agricultural operations that the city pays for his services as a teacher.

Back east Spangler would be regarded as an extensive beekeeper with his 300 colonies of bees. Many a man puts in his full time with no more than that. Beside his bees and his school work he has several acres devoted to garden vegetables and fruits, and likes to put all the theories put forward in the text-books to the test of actual practice in his own grounds.

With all his activities he finds time for a brief vacation now and then and takes his family to his cabin in the mountains near Long's Peak, where the above picture was taken. It is a delightful place to go, as the writer has reason to know, having been a guest there.

A Useful Hive Cart

By H. W. Sanders

THE illustration shows a handy two-wheeled vehicle used in our apiary and found to be of great service. The actual gears and low platform are designed and sold for use of dairymen for the transfer of filled milk cans, and are of solid construction. The platform stands only a few inches from the ground and rests on a dropped axle, which in turn is borne by the large iron wheels. The handle for pulling or pushing is clearly shown in the photograph, and two small feet at the same end support the cart when at rest. A neighboring dairyman sold his stock last spring and we bought the cart at the sale, thinking it might be useful in the garden. Then when the time came for carrying around supers it seemed a bright idea to use the new outfit. The supers kept falling over and getting mixed up with the wheels whenever the cart went over a bump, so a few old boards were nailed around, forming a kind of box. (The less said about the carpentry the better—but it works). In this, supers are piled and it will take as many as seven at a time. A rope is fixed to the far end of the platform and brought over the supers. It is held in the hand as the cart is pulled along and prevents the supers from falling out of the rear of the cart which is not boarded up. The iron frame is designed to carry great weights and will take a barrel of water, if needed. We have taken six heavy supers at a time to the honey house and find it a great improvement over a wheelbarrow. For next season we are planning to rebuild the body and to make it bee-tight with a bee-escape for use when robbers are troublesome. This year we took most of the crop before this time, and for the last few supers used the wheelbarrow.

Sturgeon Creek, Man.

Bee Behavior and Queen Introduction

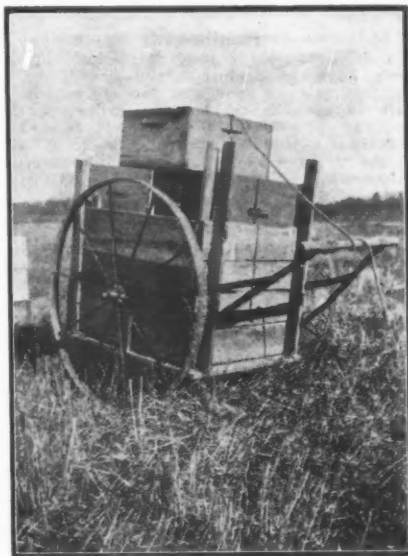
By Arthur C. Miller

It is getting rather late to talk about queen introduction, at least for the northern part of the continent, but some of the recent articles on the subject have called to my attention the fact that there seems to be a decided lack of knowledge of the laws of bee behavior in their relation to a change of queens.

In the introduction of virgins the chief cause of loss lies in the queen herself, and the older she is the greater the chance of loss. A virgin put into a strange colony is prone to run out as soon as she is free to do so, and very often, if not usually, she fails to take her location, and so either is lost or wanders into some other hive, not infrequently superseding the reigning queen.

Long years ago Henry Alley got onto this and his invariable rule was to confine the virgin to the hive until

she was quiet and settled, i. e., about twelve hours. His practice was to introduce the virgins near nightfall, close the entrance with coarse weeds that would shrink much in



Sanders' hive cart.

wilting and so automatically release the colony by the following morning. In his "baby nuclei," with a half-inch auger hole for an entrance, he closed it with a crumpled up plantain leaf,

an abundance of which were to be found in his yard.

With laying queens the results are largely dependent on the condition of the receiving colony. If it is only recently dequeened, say a few minutes to two days, a laying queen taken from a nearby hive can be successfully introduced in most any way. If the queen has been long caged she is often lost the same as a virgin—by running from the hive. If the colony has been queenless long enough to have queen-cells well started, the results are quite variable, in fact impossible to prognosticate. Therein lies the variability of the results by the sundry cage systems of introduction. If the new queen is released within about three days after the removal of the old queen—not three days after putting the cage into the hive—the new queen is rarely lost. If it is longer, the bees very often continue with their queen-cells and "supersede" the new queen. If the cage is of the type pushed into the comb, giving the queen a chance to lay as the young workers emerge, the chance of supersedence is less. Or if the introduction takes place in the height of the flow—a wretched time to swap queens—the bees may continue the cells and swarm.

Just keep in mind the "behavior of the bees" and queen introduction, as well as many other operations, become simple.

Providence, R. I.

DR. MILLER'S ANSWERS

Feeding

I have 18 colonies which have not enough food to winter. As the season is very late, I can hardly give them syrup. Would you be kind enough to tell me which would be the best way to give them food for winter? Do you think that I should wait till I put them in the cellar and then put a cake of sugar mixed with a little cream tartar on frames and cover all with bags?

QUEBEC.

ANSWER.—It is quite probable that as far north as you are, it would be too late to give the bees syrup now. The method which you suggest, to put candy over the combs, will be right.

To make the sugar candy, take best granulated sugar and stir into it a little hot water, in a dish on the stove. Don't let it burn, for burnt syrup is death to bees in winter. Keep trying it, and when you find that a little stirred in a saucer will grain, take it off quickly and pour into dishes, making cakes three-fourths of an inch to an inch and one-fourth thick. This can be used right over the brood-frames in winter. In this part of the country every girl knows how to make this sugar candy, and they call it "fudge." It is not hard, and the bees suck it readily. If it is properly made, it will be of a pale yellow color and fairly soft. There is no need of using tartaric acid in it. The tartaric acid is used only in sugar syrup, to keep it from crystallizing into a hard cake.

Bees Fighting

A very small swarm of bees emerged from one of my colonies. Not knowing which one it was, I let them go. After settling on a tree they returned and settled on a hive. The bees in the hive immediately began fighting them,

and the ground was almost covered with dead bees in a short while. I smoked them well, which caused them to go into the hive, and it also stopped their fighting. Did I do the right thing?

Some have said that this was the parent colony; I do not believe it. What is your idea about it?

OKLAHOMA.

ANSWER.—You certainly did what we would have done in your place. The smoking bewildered them and acted upon them just as when we smoke them to keep them from fighting us. We do not believe it was the parent colony that they joined, for they would certainly not have fought them. It is quite likely that that swarm came from some other apiary, if you could not find the colony from which they emerged in your own yard. Very often bees from away are attracted by the bees of an apiary and settle there, especially when they are in abnormal condition.

Did Dr. Bonney Move His Bees?

Some time ago I saw that the authorities were going to make Dr. Bonney remove his bees, and he was going to fight it. Did the case ever come to trial, and if so, what was the outcome?

PENNSYLVANIA.

ANSWER.—Replying to the above: As soon as I heard of the action of our town council I went to the Mayor, and as I have a gun-powder temper, and it was at the explosion point, I said to him: "You tell the council to go to — with its resolution." There never was a move made to make me move. I did build an 8-foot fence 40 feet long, in front of the honey house and part of the yard, as a sort of sop, but was not called on to do it, and did not feel obliged to. The most of this has now

been taken down, as I needed the lumber for other purposes.

The whole thing originated in spite work, because a man thought I killed his dog. He made a close guess. BONNEY.

Kind of Queens

What qualities are required for standard 3-band bees? If a queen is producing workers yellow to tip on under side, only 3 yellow bands across the back of abdomen, how should such bees be classified 3-bands, or goldens? Is there any such race of bees known as goldens? Where do our so-called golden bees spring from? I have several queens producing 5-band bees, but one I ordered from a golden breeder is producing about 90 per cent 3-band and not more than 10 per cent goldens, while the drones have four and five yellow bands. How should these be classified? I am inclined to believe our so-called golden bees are only sports from 3-band bees bred for their color. Am I right or wrong? ARKANSAS.

ANSWER.—You are right. Goldens are only Italian bees bred for color. So there is absolutely no positive standard, so far as I know. In some cases the lighter color is brought about through a cross with Cyprians and it is probably the cause of some of these golden bees being very cross. As a rule, golden Italian bees are as gentle as the average pure Italian.

Pure Italian bees are active, peaceable, show three yellow bands, including the narrow one next to the thorax. They hang quietly to the combs, when properly handled, and never crowd to the corners and drop off, as common blacks do.

Clipped Queens

In the case of queens with clipped wings, is there not the danger that the bees may still decide to swarm, and may ill-treat the queen on finding her unable to go with them. This happened in my case this season, and the queen was thrown out.

Will you advise:

1. What precautionary steps ought to be taken generally in the case of clipped queens?
2. What should be done if queen-cells are found in a hive with a clipped queen?

I adopted the Demaree system and shall be obliged if you will make your replies applicable to same.

ANSWERS.—1. I'm not sure that any precautionary measure should be used other than is used with queens unclipped.

2. Nor is there anything different to be done when queen-cells are found.

Yet in either case it makes a big difference whether queens are clipped or not. If a colony decides to swarm, and actually does swarm, if the queen's wings are whole, off goes the swarm, queen and all, if you are not on hand to hive it, and sometimes when you are on hand. If the queen is clipped, you can pick her up, and the swarm is at your mercy. The worst that can happen is that you may not find the queen, and she may be lost, but it is better to lose the queen than to lose both queen and bees. If a queen cannot fly, the bees will swarm just the same, but the bees will return, and generally so will the queen. Then they may continue to swarm till a young queen emerges, when the old queen will be done for. But it's up to you to provide against that

Bees Get No Honey

I have 10 colonies to look after, and they have not made any comb honey this year. What is your idea as to their not making any honey?

When is the best time to feed for winter? INDIANA.

ANSWER.—Bees can store surplus honey only as they can gather nectar from the flowers, and they cannot always get enough nectar. It may be too wet, it may be too dry, and sometimes when it seems neither too wet nor too dry, and when there are plenty of flowers,

there is no nectar, and no one seems to know why. We just say it was a poor season and let it go at that.

The sooner you feed for winter the better, after you know the bees will need feeding, although in your locality you may feed even as late as October. November is a bit risky

Foulbrood

1. If a swarm of bees is affected slightly with European foulbrood and has stored 7 hundred or more pounds of honey, would it be safe to use the combs after extracting the honey?

2. Is it possible for a strong swarm of bees to get rid of a slight case of foulbrood after infection? IOWA.

ANSWERS.—1. Such combs are probably safe, and yet I should hesitate about using them in an apiary entirely free from the disease.

2. I think that has happened with European, but perhaps not with American.

Wintering

Last winter I wintered my 20 colonies without losing one, by putting a super on each filled with a chaff cushion and giving sufficient insulation, beside good winter stores. But this fall I intend to care still better for my friends, and thought it advisable also to put a super, empty or filled with inside fixtures, that is, without sections beneath the brood-hive. Would you advise me to do so? Would you leave that super empty or filled with the inside fixtures, or would you advise even to let sections partly or entirely finished within the super? By putting such a super under the hive I thought cold winds might be kept from the cluster. ILLINOIS.

ANSWER.—There should be advantage in having a story under the brood-chamber, but don't have sections in it, as it would spoil the sections for future use.

Decoy Hives—Lost Queens

1. Where a swarm leaves with a virgin queen and afterwards she is lost on her mating trip, what becomes of the swarm?

2. When using decoy hives, should I leave the comb in them? If I do, the moths will destroy them; if I don't, they would not attract the bees. PENNSYLVANIA.

ANSWERS.—1. If a virgin issues with a swarm and is lost on her mating trip, the bees are likely to return to their old home. Yet, for anything I know, there may be exceptions.

2. An empty hive without combs may serve, but it is better to have the combs. If moths attack them you can exchange them for fresh combs, giving the wormy combs to the bees to clean up.

(By using only one comb the moths are not as likely to trouble. More can be added as soon as a swarm is secured. New combs in which no brood has been reared are not so likely to be destroyed by moths as old combs.—F. C. P.)

Square Hives—Decoys, Etc.

1. Do you know of anyone using square hives who turns the frames crosswise of the entrance during the winter? If so, do they claim better wintering?

2. When frames are reversed (inverted), bees will fill the space between the comb and bottom bar, but will they not fill it with drone-comb? PENNSYLVANIA

ANSWERS.—1. No, we know of no one using a different entrance in winter. This is a much debated question in Europe, but we have never known it to be settled either way.

2. Yes, very probably.

Honey Fermenting

I have been interested in beekeeping for the past five years. I have a crop of honey that has me puzzled. I noticed the combs as I took them off of the hives. The cappings (not the entire comb, but about one-third or less) were puffed up high. I broke some of the cells open with a small piece of wood and I found the honey bubbled, or in a state of fermentation. I extracted this honey and bottled it,

and three days after it showed signs of fermenting.

Will you please give me some information about this? What caused it to ferment in the comb? Is there anything I can do to save this honey, and still sell it as pure honey? ILLINOIS.

ANSWER.—It is very difficult to reply to this enquiry in a satisfactory manner. There is so much in the honey-producing business that we do not know. The best thing we can do is to give an instance of something similar, taken from the pages of the American Bee Journal for April, 1917. The editor, having called upon some leading eastern apiarists, was told by Mr. Irving Kenyon that for two years his honey had been fermenting in the cells and bursting the cappings. He thought it due to a microbe and thought of changing his combs, which probably carried the ferment over from one year to another. In June, 1918, page 205, he stated that he had made the change by shaking the bees from the combs and rendering the combs, and had less than one-fourth of one per cent of the trouble.

In your case it is probably only accidental. It is perhaps due to unripe honey, sealed too soon by the bees. We would advise heating the honey in a double boiler, "au bain-marie," as confectioners call it, taking care not to overheat it. Heating will remove the excess moisture and will also evaporate the gases formed in it. This will probably stop further fermentation. The honey can be sold as pure honey, but must not be offered as a good grade. It will very likely retain a little of the acidity of fermentation.—Editor.

Swarm Control for Comb Honey

I have given a trial to the plan as set forth in the August number of the Journal on page 266. The drones in the hive body at the side clogged the entrance into the other hive body completely, as I found when I opened it to exchange the empty brood combs with others from the mother hive. I had given some ventilation at the top of the hive at the side. But I found a lot of bees suffocated on the bottom-board, mostly drones, but also some dead worker bees. I therefore took the hive away from the side and placed it on top of the mother hive with an escape board between. Next day the upper hive body was still filled with bees. I left it on another day and night. But the workers had not left. So I proceeded to make an examination, and I found a virgin queen, a black queen, which took wing before I could catch her. The workers I shook from the combs in front of the mother hive and they entered at once. What became of the black queen? NEW YORK.

ANSWER.—The experience which you relate might have been expected in a colony having drones, since the only opening from the side hive was through a queen-and-drone excluder into the main hive. Mr. Smythe evidently did not have drones when he experimented in this way. So we can see that things do not always turn out as anticipated.

What became of the queen? It is not very easy to answer. Since she had never before taken a flight, it is quite probable that she got lost or went to another colony. In either case she would not survive.

Name of Apiary

In reading the last number of American Bee Journal I ran across your article "Bees in the Bush and Trout in the Brook," and I think that is the ideal name for the location I am in.

Your description of the trout streams is just like the ones we have here, and, Oh, Boy! the fishing is certainly unsurpassable.

Mr. Bartlett is surely not in as good a location as mine, for here we had a very heavy fall flow from goldenrod, buckwheat and bone-set.

We are packing our bees for winter now, and hope to bring them through in good shape. If you contemplate coming to northern Michigan again, come and see us in Oscoda County. We are in an ideal location for bees. Our heavy honey yielders are willow, dandelion, alsike and white clover, apple, June-

berry, wild cherry, basswood, raspberry, black-berry, buckwheat, goldenrod, fireweed and boneset. Can you beat it?

Can you think of a good name for my apiary?
MICHIGAN.

ANSWER.—According to the census, your county appears to have the smallest population of any county in the State, 2,027. This indicates plenty of wild flowers, indeed. Why not call your apiary "Wilderness"?—C. P. D.

Extracting

Would it be asking too much for a brief sketch of the manner in which you do your extracting with reference to the two points mentioned below? I am now reaching a stage with my bees when kitchen methods of extracting are not adequate and I propose erecting a honey house. I propose using a Dadant uncapping can and running the honey from the extractor into a galvanized tin or iron tank, from which I shall draw it off as required. But I have formed no satisfactory ideas as to (1) rendering the cappings, and (2) disposition of the empty combs for the bees to clean out.

1. When the receptacle in which the cappings are rendered cools, I am unable to remove the wax without breaking it badly, and much of it sticks to the sides. I should like to know how this rendering is best accomplished.

2. When I replace my supers of empty combs upon the hives, the bees take possession and clean out the combs satisfactorily, but they won't vacate, and this means a lot of extra work in shaking them off again. In an out-apiary this is a great inconvenience, as an extra trip or two is necessary. And, by the time this shaking is wholly accomplished, particularly if it be towards the end of the season, the bees are in an uproar and are apt to sting badly. If I pile the supers in the yard, I am apt to cause robbing. I should like very much to know your practice as to these two matters.

3. How do you get the bees out of the supers for extracting?

BRITISH COLUMBIA.

ANSWERS.—1. When you render cappings, or any beeswax for that matter, you should have some flaring cans at hand, 2 inches wider at the top than at the bottom. We use cans that are 12 inches high and 14 inches wide at top. They hold about 40 pounds of wax. We pour about a quart of hot water in the can first, and then the hot beeswax. Let it cool slowly, and the residue will all be found at the bottom of the cake, except such things as dead bees, which ought not to be allowed to float on the wax, but should be skimmed off, in case any are there. You will find that, in cooling, the wax shrinks away from the sides of the can. Should any part of it stick fast, when cool, just turn the can over on a block and pour boiling water outside on the sticking spot.

2. This is a mooted question. Many apiarists prefer to put the supers out of doors, and let the bees clean them out. We do not like it. It excites the bees, and, besides, the neighbors' bees can help themselves, too. If you put an entirely empty super between the brood-chamber and the supers to be cleaned, the bees will not remain in them, unless the weather is so hot and the colony so populous that they can fill that empty super with bees. Usually we leave the supers on to be cleaned until our next trip.

3. We have found nothing equal to the Porter Bee escape, to get the bees out of the super. It requires a trip to the apiary the evening before extraction, but it is well worth the trouble.—Editor.

Honey Disappeared

I have a colony of bees in a Langstroth hive. I fitted a Falcon 8-frame hive and placed it on top. The bees filled the 8 frames with honey and had it capped nicely. When I took it off today there was nothing but nice white combs, but no honey. Now I want to know what the bees did with it, and why they did it?
PENNSYLVANIA.

ANSWER.—I would be inclined to say that

the colony was robbed. But you say it is strong. So that cannot be it, unless you are mistaken about its strength. If it was robbed, there would be no honey in the lower hive either.

There is another guess, and that is that the upper hive combs were not filled full of honey, but were full only along the top edges. That is sometimes the case when a man does not look carefully or does not lift them out.

If you say it was neither the one nor the other, I am done guessing. You will be just as good as myself for the next guess.

Moths

I am a florist and I keep a few colonies of bees "for the fun of it." I double up every fall to keep the number of colonies down to 5 or 6. I find it impossible, with my knowledge, to preserve free from moths and larvae my extra combs until swarming time the next year. I keep them in a closed chest in an outbuilding, but the worms are there ahead of me. What can I do?
NEW YORK.

ANSWER.—There is a failure somewhere in your method. If the combs are free from eggs or larvae of moths when put away, and the chest is well closed, they will remain exempt until exposed again. Perhaps your mistake is to think that they do not contain any traces of moths when put away. Often eggs are laid on the edges of combs by moths, which the bees would have removed if left in their charge.

Try a dose of carbon-disulphide spread on a rag in that chest, as you put the combs in it. Then give another dose in 3 weeks. If there are no living moths then, there will be none, for moths cannot stand a New York winter in an outbuilding.

When you take them out in spring, put them in charge of colonies of bees immediately.

Jumbo Hive—Demuth Winter Case

1. While examining my bees today (September 6), I found one colony which had one unsealed queen-cell with the larva about 4 days old, but no other brood or eggs in the hive. This queen was introduced in August and is still in the hive. Where did the eggs for the queen-cell come from, when there is no other brood in the hive?

2. How would a Jumbo hive be for comb honey, if I put in 9 frames spaced 1½ in. and a division board? Would it prevent swarming?

3. What do you think of the Demuth wintering case, when used with a 10-frame hive?
MINNESOTA.

ANSWERS.—1. Your letter is not explicit, as you do not state when this queen hatched and whether she was introduced by you into another hive. Perhaps you do not mean that you introduced her, but simply allowed her to hatch there. There is considerable mystery about this. If I am to give an opinion it is that there was a queen already in the hive, about ready to lay, when you saw this larva in a cell. I would suggest that the egg in that cell was laid by a drone-laying worker and that this larva never matured into a queen, but died and was thrown out, as usually done by the workers in such cases.

2. A Jumbo used as you proposed would certainly be nearer a non-swarmier than a smaller hive. But you can never be entirely sure of preventing swarming.

3. The Demuth wintering case, with the frames on end, is very good. The only objection is the labor involved.

Feeding

I have two or three colonies of bees that will have to be fed this winter. Can they be fed on sorghum molasses? If not, what can I feed them, as I cannot get sugar?
ILLINOIS.

ANSWER.—Molasses is death on bees in

winter. It would be better to let them starve than to feed them on something that would kill them.

If you cannot get honey that you know to be free from germs of foulbrood, write to B. F. Kindig, President National Beekeepers' Association, stating your case. He will perhaps be able to help you out.

Queens

1. Can queens be reared in the same compartment with a young, vigorous queen without them casting a swarm upon the sealing of the first cell? That is, before they are strong enough to require another story?

2. About how many queens will ten nuclei mate in a month conditions being favorable?

3. What distinction do breeders make between untested and select untested queens?

4. Is it desirable to breed from a queen whose bees persist in building an extra amount of burr and brace comb, yet other points being in her favor?

5. What are some of the criticisms you have to offer in using a 10-frame hive body with three bee-tight compartments; the two outside ones having entrances facing the same way?
AN AMATEUR.

ANSWERS.—1. Not if the colony is normal and the crop promising. As a rule, the queen will destroy the cells or the bees will prepare to swarm.

2. This depends upon your management. If a cell ready to hatch or a virgin is inserted in a nucleus, she will be likely to mate inside of a week or ten days. After that it is only 2 or 3 days before she begins to lay. I would say you might rear two queens a month, on the average, in each nucleus, conditions being favorable.

3. A select untested queen would be one that was large and very active.

4. The building of brace combs is probably due to accidental causes, hence would offer no objections. But if you really have such bees, it may not be advisable to breed from their queen.

5. A 10-frame hive body, divided into 3 bee-tight compartments with entirely full division-boards, would give less than 3 frames in each. They would probably do for nuclei.

Size of Hives

Up to date I have used the 8-frame hive with two stories for the brood-chamber, with the same result as reported by A. C. Miller in the American Bee Journal. Often have I found that bees gnaw down the cells in the lower stories and often combs are found in the spring with an abundance of pollen apparently too hard for the bees to remove. In consequence of this the queen goes to the second story and the lower is neglected or partly abandoned. This is a source of annoyance to the keeper. Combs are too expensive to melt them by the wholesale, and to clean them takes time, and "time is money." Last spring I took a big bunch of these combs and soaked them for a whole day, then I took an awl and "plowed" up the pollen, running the awl through the cells near the middle of the comb. Combs treated thus were pretty well cleaned by the bees. However, I am apt to believe that the Jumbo hive would remedy this trouble considerably, because there is but one story, and they are almost compelled to clean up unnecessary pollen. I have always been in favor of a large brood-chamber and I was under the impression that two 8-frame hives would be all right, but now I see that it is not the right kind of a hive. So far I have made two Jumbo hives with standard frames, 10 for each hive. Is this the right number, or should I use more? Please state exact width of a standard Jumbo hive.

2. We winter bees on the summer stand under a shed, protected in winter on three sides, west, north and east. We do not use much packing at all, except a collapsible winter case for each. Do you think it would be advisable to use burlap over the frames, four-fold, with the cover put on loose to give a little top ventilation?
INDIANA.

ANSWERS.—1. Bees do not usually place too much pollen in the brood-combs, unless they are queenless, or unless they have great op-

opportunities to harvest pollen after brood-rearing has ceased. This is unusual. But when they have two brood-nests, it is quite probable that there is more storing in one of those nests than if they were confined on just the room they need for brood, and for winter food.

Your method of compelling them to clean out the pollen is ingenious and will probably be efficient. Usually there is plenty of demand for the pollen, in prolific colonies, unless it is mouldy and unfit for use, when spring comes.

The Jumbo hive, such as is manufactured, has the great fault of having its frames spaced only $1\frac{3}{8}$ inches from center to center, as already mentioned in these columns. The wider

spacing of $1\frac{1}{2}$, which we have recommended and which we use, is certainly desirable.

We are recommending a hive measuring $16\frac{7}{8}$ inches in width inside, which takes freely 11 frames of the Hoffman style of the $1\frac{1}{2}$ -inch width. We do not use the Hoffman frame ourselves, but it seems to be popular. With a 11-frame hive, if you want to use only 10 frames in it you can use a division board in place of one of the frames, as we do. The 11 frame Jumbo has only a little more breeding space than the 10-frame Dadant standard hive.

2. Light burlap, with absorbents over it, is good. But don't let a current of air pass through.

The results showed, among other things, that the queens mated by hand-picked drones, not more than about two weeks old, became drone breeders. They produced from less than 1 per cent to about 50 per cent of workers.

Carniola Today

As you know, I left Carniola, my country, 5 years ago, coming on purpose to study American beekeeping at the University of Minnesota.

I think I am very lucky to have all my folks living, when thousands of others have lost all their relatives in the new Yugoslav State (formerly belonging to Austria.)

My father wrote, in the last letter I received from him, that nearly 75 per cent of the bees died in Carniola on account of shortage of sugar and loss of men in this war. He himself lost over 400 colonies in 1917, this leaving him 870. Honey was selling way above the prices ever known; his honey was sold at 57 kronen, or about \$10 a pound. Other goods are too high to be mentioned.

FRANK A. ROJINA,
State Farm, University of Minnesota.

Current Notes

Members of the Dubuque Branch or the Iowa Beekeepers' Association held their annual meeting at the home of George Spoerl, near Durango, Iowa, September 23.

There was a meeting of the beekeepers of the county held at Richland Center, Wis., October 10. Mr. McMurray, Assistant State Bee Inspector, was present. James Gwin is Secretary.

A Community Bee Association has been organized at Owensboro, Ky., under the direction of H. R. Niswonger, bee specialist from Lexington, Ky.

Beekeepers of Grant County, Wisconsin (of which there are 250) will make an effort to secure one of the county bee meetings that is to be held during the coming winter.

Three-Day Meetings in Wisconsin

Interest in beekeeping in Wisconsin has become so pronounced, following the beekeepers' chautauqua held at Madison, Wis., last August, that H. F. Wilson, Secretary of the State Association, has announced a schedule of thirty 3-day meetings to be held in various parts of the State during the coming winter. These schools will be under the direction of H. L. McMurray, representing the United States Department of Agriculture, and will be held wherever an attendance of 25 persons is guaranteed. Meetings will begin during the present month.

Meeting

The Washington State Beekeepers' Association will hold its annual meeting in Seattle, January 22-24, 1920. For particulars write to the Secretary, H. Christensen, Toppenish, Washington.



What is a Bee Line?

There seems to be a very general impression that the honeybee on returning from the field, takes a direct route, flying in a straight line to the hive. So general is this idea that a "Bee Line" has come to mean a straight line between two points.

That bees often vary their direction, in unfavorable weather, there is little doubt. E. A. Welch, of Quincy, Ill., has bees on both sides of the Mississippi river near that place. The river is in the neighborhood of a mile in width at that point, yet the bees cross the stream in both directions. According to Mr. Welch, the bees follow both up and down stream on both sides to take advantage of the protection of the bridge when crossing in windy weather. The flight is very marked at such times, the bees scattering out in a fan shape and converging in the same manner at the opposite side of the stream.—F. C. P.

Lack of Information

I sold six colonies to a man who had just moved into the neighborhood. He said he used to keep bees. But two weeks ago he sent his son to me to ask if "bees carried honey on their hind legs?" He said he had been watching them for two days, and they were going into the hive with a lot of yellow stuff on their hind legs. I didn't laugh, but got my Langstroth on 'the Honeybee, revised by C. P. Dadant, and showed the son the anatomy of the queen bee, and advised his father to get Langstroth, revised, same as I did when I sold him the bees.

I don't know how a man can "keep" bees and not know where they carry their honey, and where they carry their pollen. I explained to the son that this yellow "stuff" was pollen, and these receptacles were little baskets, made for this very purpose.

Illinois.

Bees Are Dying

It is reported that H. A. Scullen,

bee expert from the Washington State College, has visited the locality around Prosser, Wash., in an effort to determine the cause of excessive mortality among bees. Actual extinction of the industry is threatened, and several plans have been made to remedy the alarming situation. W. H. Tucker reports 80 colonies totally lost and 150 badly depleted, at a loss of from \$10,000 to \$12,000, which, of course, includes the possible honey crop, which promised to be a good one. E. E. Starkey reported 50 colonies entirely lost and others depleted, making his loss some \$2,000. K. P. Runa said that of 25 thriving colonies he has not one left. Others report similar conditions. Dr. C. H. Ponting, another leading beekeeper, is preparing to remove his apiary immediately. It has been suggested that spraying the fruit-blooms with poisonous spray material may be one cause of the bee-mortality. It is hoped that the real cause may be discovered and a remedy found for it.

G. W. YORK.

A New Building at Guelph

The contract has been awarded for a fine new building to be devoted exclusively to the use of the beekeeping department of the Agricultural College at Guelph, Ontario. The building is to be two stories and basement, and will cost \$40,000. When fully equipped it is thought the cost will total \$60,000.

Work on the new building will begin at once and continue during the winter months. We congratulate Professor Millen and the college on the new building. We are informed that there are 260 freshmen students who are taking beekeeping at the Ontario Agricultural College this season.

Mating Experiment

A bee mating experiment was carried out last July by F. W. L. Sladen, Apiarist of the Dominion Department of Agriculture on Duck Island, at the eastern end of Lake Ontario. Duck Island is 8 miles from the nearest land and no bees are kept there.



PRICE LIST—Select Untested Queens
May 15 to July 1

One to four, inclusive	\$2.50 each
Five to nine, inclusive	2.45 each
Ten or more	2.40 each

July 1 to November 1.

One to four, inclusive	2.00 each
Five to nine, inclusive	1.95 each
Ten or more	1.90 each

Bees by the Pound—After May 15.

One pound	\$4.00
Two pounds	7.00

WE ARE NOW BOOKING ORDERS FOR QUEENS AND PACKAGE BEES

for the season of 1920 and will be pleased to place your order on our list for early shipment

Every queen we send out is reared by me, personally, and I promise you the very best stock I am capable of producing.

Safe arrival, pure mating and entire satisfaction is our guarantee.

"Queens received. If their bees are as good as the queens, they will be 'Hum Dingers.'"—A. P. Berryman, McHenry, Kentucky.

"Thank you very much for the excellent quality of queens you sent and for the fine treatment you have given me."—Dr. L. E. Moore, Gary, Indiana.

"Using no smoke or veil, I looked thru the hive containing your queen, which was as large as any I ever saw. Her ten frames of brood completely covered with yellow bees was as pretty a sight as one could ever expect to see."—D. L. Shoaff, Shelbyville, Illinois

"Your bees are the best that I ever handle in my fifteen years of beekeeping."—Percy Saunders, Antigonish, Nova Scotia, Canada.

"Your queens are the most beautiful of any I have ever seen."—Kenneth L. Carlock, Baylis Illinois.

"The queen you sent me is such a beauty that I can hardly get her off my mind."—F. J. Rettig, Wabash, Indiana.

"The first lot of bees I got from you were fine, but the last were better yet."—J. H. Warren, Elliott, Iowa.

"The bees I got from you are the finest lot I ever saw and they don't try to sting."—Jacob Williamson, Riverton, Illinois.

"The queen I got of you a year ago was the only one in my yard that gave a surplus."—Albert Hass, Louisville, Kentucky.

"The queen I got of you is sure some worker. Her bees have made about three times as much honey as the others I have."—Henry Fromberg, Crandall, South Dakota.

"Your bees certainly are good stock."—H. L. Buchanan, Logansport, Indiana.

"You will be pleased to know the queen arrived in good shape and is laying well."—E. A. Palmer, Empire Post Office, Panama Canal Zone.

JAY SMITH, Route 3. Vincennes, Ind.

In lots of ten or more pounds, 5 per cent discount. Write for our booklet and complete price list.

BOOKS FOR CHRISTMAS GIFTS

Our Backdoor Neighbors, by Frank C. Pellett. An interesting account of the author's experience with wild creatures, \$1.50.

Langstroth on the Honeybee, revised by Dadant. The most complete book on beekeeping ever written, \$1.50.

1000 Answers to Beekeeping Questions, by Dr. Miller, \$1.25.

First Lessons in Beekeeping, by C. P. Dadant, \$1.00.

Beginner's Bee Book, by Frank C. Pellett, \$1.25.

Productive Beekeeping, by Frank C. Pellett, \$2.50.

Practical Queen Rearing, by Frank C. Pellett, \$1.00.

Life of the Bee, Maeterlinck. A wonderful story of the life within the hive. Not a textbook on beekeeping, \$1.00.

Honey Makers, by Margaret Morley. An interesting account of the part the bee has played in the world's literature, \$1.50.

Flower and the Bee, by Lovell. An exhaustive account of the part played by the bees in plant pollination, \$2.00.

Embryology of the Honeybee, by Dr. Nelson. A technical account of the development of the bee from the egg, \$2.00.

How to Keep Bees, by Anna Comstock, \$1.20.

Beekeeping, by E. F. Phillips. A comprehensive book, \$2.00.

ADD 75 CENTS TO THE PRICE OF ANY OF THE ABOVE BOOKS AND GET THE BOOK AND AMERICAN BEE JOURNAL FOR ONE YEAR

AMERICAN BEE JOURNAL, Hamilton, Illinois

Wisconsin Convention

The Wisconsin beekeepers will hold their annual convention at Madison on December 4 and 5, meeting in the Senate chamber at the Capitol building. An extended program has been provided and a good attendance is anticipated.

National Organization

At the last Convention of the National Beekeepers' Association the officers of the organization were authorized to call a meeting of delegates from the various States to be held at Kansas City, Mo., during the coming winter. This meeting will be held January 6-9, 1920. The meeting will be held in the Muehlbach Hotel, corner Baltimore avenue and Twelfth street, which will also be the headquarters of the delegates. It is of extreme importance that every State beekeepers' organization arrange for the sending of one or more delegates to this convention. The important matters which will be brought up for consideration have been discussed in previous issues of this Journal. Opponents as well as advocates of a reorganization of the National should be present in order that the recommendations which may be made to the National Beekeepers' Association may be consistent with the best interests of the beekeeping industry. The delegates should carry to the meeting at Kansas City credentials showing them to be the authorized representatives of the various organizations. This is of very great importance, as anyone who is not possessed of proper credentials will find himself without a vote in the meeting.

It appears to me that this meeting is to be one of the most important meetings of the beekeepers within recent years. The future of the National Beekeepers' Association will doubtless be outlined at this meet-

ing. Everyone who is sincerely interested in beekeepers' organizations, whether of a co-operative nature or otherwise, should see to it that a delegate is appointed at the next meeting of the association, or if no meeting is to be held between now and January 6, that the officers of the organization appoint a delegate.

B. F. KINDIG,

President National Beekeepers' Association.

Cortland County Meeting

The Cortland County, New York, Beekeepers' Association held its annual fall picnic September 20, at the home of James Waters, Cuyler, N. Y. The principal address was delivered by George H. Rhea, Bee Specialist from New York State College of Agriculture.

Beginner's Bee Book

The "Beginner's Bee Book," by F. C. Pellett (Lippincott), is not a textbook. A text-book is a book which is intended for class instruction. The "Beginner's Bee Book" is rather an interesting account of the attractive side of beekeeping, its outlook, the advantages of honey production, together with short accounts of the division of labor in the bee family, the ways in which it is increased, the harvesting of honey, diseases, enemies and wintering problems. It ends with a short glossary. The book contains 180 pages and 17 illustrations. It sells at \$1.25.—C. P. D.

Illinois Convention

The twenty-ninth annual meeting of the Illinois State Beekeepers' Association, will be held at Springfield, on the 9th and 10th of December, 1919. Notice is hereby given that at the last meeting it was voted that at the next meeting the matter of a change in the membership fee would be considered.

The program committee will arrange the best program they are able to secure, and send to the members on postals, as usual, and all who come will have a good time, certain.

Prizes as usual for essays. Let's have a crowd and a good time. Headquarters at the Leland Hotel.

JAS. A. STONE, Sec.

Tennessee State Meet

The Tennessee State Beekeepers' Association will meet in Nashville, December 11, 1919. Our editor hopes to be present. Particulars may be secured by addressing the Secretary, Mr. G. M. Bentley, at Knoxville, Tenn.

Indiana Convention

The Indiana beekeepers will hold their annual convention at the State House in Indianapolis on December 18 and 19. B. F. Kindig, Jay Smith and E. G. Baldwin are among the speakers named in a letter received from Secretary Ross B. Scott, who anticipates one of the best conventions ever held in that State.

Chenango County Meeting

A letter from Secretary T. R. Gordon announces the second annual meeting of the Chenango County Beekeepers Society to be held on December 20, at Norwich, N. Y. A good program will be provided and a good attendance is expected.

Chicago-Northwestern Meeting

The annual meeting of the Chicago-Northwestern Beekeepers' Association will be held at room 138, in the Great Northern Hotel, Chicago, December 15 and 16, 1919. A good program is being prepared and will be mailed for the asking to anyone interested.

JOHN C. BULL, Sec.-Treas.,
Valparaiso, Ind.

Index to Vol. LIX

SUBJECTS

Aeroplanes for Beekeepers—406.
Aluminum Honeycomb—99.
American Fighters in Europe—53.
Ants—132, 184, 384.
Anzac in Hamilton—263.
Apiary, Size of—97.
Appropriations for Beekeeping—314.
Arizona, Inspector for—386.
Articles, Dating 272.
Australia, the Beekeeper's Paradise—265, 297.
Average Yield per Colony—165.
Baby Nucleus—236.
Banana—152.
Barbeau System of Queen-Rearing—234, 308.
Bartholomew to Florida—351.
Bee Behavior and Queen Introduction—419.
Bee Club Organized—386.
Bee Clubs, Boys' and Girls'—86.
Bee Flowers of North America—115.
Bee Line, What is—422.
Bee Magazine, International—373.
Bee Periodicals, Oldest—10.
Bee Trees—349.
Bees and Fruit—315.
Bees as Trophies of War—156.
Bees and Grapes—161.
Bees Clustered Outside—311.
Bees, Cross—132.
Bees Disappearing—278.
Bees Dying in Winter—133, 422.

Bees, Endurance of—337.
Bees Fighting—419.
Bees, How Many in Pound—314.
Bees in Battle—314.
Bees in the Bush—336.
Bees Leaving Hive—385.
Bees Loafing—313.
Bees Not Working—384.
Bees, Price of—190.
Bees Returning—131.
Bees Smothered—97.
Bees Stinging Horses—314.
Beeswax, Black—129.
Beeswax, Mystic Use of—342.
Beginning with Bees—27, 51, 168, 380.
Beginning With Bees, Boys—199.
Behavior of Bees—349.
Beekeepers By the Way—14, 52, 80, 125, 197, 345, 381, 418.
Beekeeping, Dignity of—127.
Beekeeping in Missouri River Hills—331.
Belgians Revived—156.
Benton's Travels—307.

BIBLIOGRAPHY of—

Beekeepers' Letter—229.
Hawaiian Beekeeping—11.
Porto Rico Beekeeping—156.
Sweet Clover—84.
Black Bees—63.
Blessed Bees—202.
Bluevine or Climbing Milkweed—123.
Bottoms for Hives—202.
Boys and Bees—306.
Boys Beginning with Bees—199.
British Columbia, Beekeeping in—418.
Brood—62.
Brood Combs Above Sections—96.

Brood, Dead—167.
Brood, Equalizing—240.
Brood in Super—406.
Brood in Winter—28.
Buckeye or Horse Chestnut—299.
Building Colonies for Honey Flow—88.
Building Up Colonies in Spring—79, 131.
Bumblebees and Smoke—409.
Bumblebees' Nest—408.

Cages for Introducing—58.
California, Introduction of Honey Bee Into—268.
California Pioneer, Harbison—122.
California Short Courses—43.
Candy, Boosting—192.
Carbon Disulphide, Use of—98.
Carniola Today—422.
Carniolans—27, 62, 350.
Carpet Grass—16.
Catalpa—278.
Caucasians—24, 350.
Cell, Trips to Fill—206.
Cellar Wintering (See Wintering).
Cellars for Bees—165.
Cement Paper to Metal—240.
Central Plant for Extracting—93.
Certificates for Beekeepers—241.
Chile, Beekeeping in—48.
China Tree, or China Berry—271.
Climbing Milkweed—123.
Color of Bees—26.
Colorado, Comb Honey Production in—374.
Colorado, Trip to—300.
Comb Honey, Selling—311.
Combs, Old—167.
Combs, Old, Using—26.
Contract, What Constitutes—383.

Covers, Metal—313.
 Corn, Honey From—49, 99, 100, 125, 205.
 Cotton, Honey From—80.
 Criticism—373, 415.
 Cross Bees—240.
 Cryptograms, Do They Cause Disease?—305.

Dandelions—203, 240.
 Decoy Hives—133, 420.
 Demaree Plan—204, 277.
 DeMuth, Geo. S.—89.
 Denmark, Prices in—170.
 Desertion of Bees—349.
 Dickinson of California—52.
 Direction, Sense of—21.
 Disease Control—46.
 Disease Control by Education—84, 123.
 Disease Control in Texas—12.
 Diseases of the Adult Bee—228.
 Diseases, Fumigating for—91.
 Division—313.
 Division Boards—372.
 Dixie Beekeeping—198.
 Drone Layer—243.
 Drones—Black—349.
 Drones in Winter—97.
 Dummies vs. Division Boards—372.

Eggs, Fertile—312.
 Eggs, Fertilizing Drone—413.
 Eggs, Two or Three in Cell—277.
 Electrical Imbedding—345.
 English Notes—11.
 Entrances—53, 203, 240.
 Equalizing Brood—348.
 Equipment—313.
 Examination of Colonies—227.
 Exhibit at Chenango Co. Fair—387.
 Experiments, Co-operation in—197.
 Extension Work on Pacific Coast—133.
 Extracted Honey Production—15.
 Extracting—313, 421.
 Extracting at a Central Plant—93, 206.
 Extractor, A New—416.
 Extractor of Coveyou—373.

Failure vs. Success—55.
 Failures—301.
 Farm Manuals—134.
 Feeder—A Safe—205.
 Feeder, A Simple—92.
 Feeding—201, 277, 348, 385, 419, 421.
 Feeding in Cellar—26.
 Feeding Flour—190.
 Feeding in Spring—131.
 Feeding in Winter—28, 62.
 Female, Deadly—10.
 Flax—165.
 Florida, Beekeeping in—206.
 Florida, Bee Laws of—350.
 Florida, Quarantine Law in—300.
 Flour, Feeding—190.
 Force vs. Education—46.
 Foulbrood—97, 132, 166, 201, 238, 240, 312, 313, 348, 373, 385, 420.
 Foulbrood, American—299.
 Foulbrood Bees, Confining—61.
 Foulbrood, Disinfection—98.
 Foulbrood, European—58.
 Foulbrood, Fumigating for—91.
 Foulbrood, Getting Rid of—233.
 Foulbrood, Prevention of—376.
 Foundation—25.
 Foundation, Bottom Starters—240.
 Foundation Fastener—62.
 Foundation Sagging—164.
 Frames—165, 239.
 Frames, British—406.
 Frames, Deep vs. Langstroth—50.
 Frames, Shallow for Brood—120.
 Frames, Size of—129.
 Frame Spacing—166.
 Frames, Spacing Wide—192.
 Freight Rates on Honey—228.
 French Bee Magazine—85.
 Fumigating for Diseases—91.

Gallberry—151.
 Gleanings Editor ill—382.
 Goldens—98, 168, 205.
 Graham, Migratory—125.

Harbison, J. S.—122.
 Hares and Bees—347.
 Hawaiian Beekeeping—11.
 Hawkins to Lewis—205.
 Hearing Sense of Bees—164.
 Hermaphrodite Bees—93.
 Hive Cart, A Useful—419.
 Hiveless Bees—274.
 Hive Roofs—385.
 Hive, Size and Comb Capacity—162.
 Hive Stands—202.
 Hives—385, 412.
 Hives, Jumbo—62, 421.
 Hives, Kinds to Use—27, 421.
 Hives, Large—22, 96, 304, 337, 386.

Hives, Large Increase With—193.
 Hives, Large vs. Small—341.
 Hives Long Idea—124.
 Hives, Making Large from Small—153.
 Hives, Non-Swarming—96.
 Hives, One-Story Jumbo or Two-Story Langstroth—309.
 Hives, 13-Frame or Square—344.
 Hives, 20-Frame—202.
 Hives, Twin and Others—274.
 Holland, Bees in—373.
 Honey Cans, Soldering—270.
 Honey Comb Production—378.
 Honey Exporting—228.
 Honey Fermenting—420.
 Honey for Home Use—346.
 Honey Grading—192.
 Honey Grading in New Zealand—371.
 Honey, Granulated—411.
 Honey Granulation—132, 204, 314, 372.
 Honey Heating as it comes from Extractor—21.
 Honey, High Priced—350.
 Honey, Marketing—237, 241.
 Honey Plants—120, 123, 124, 239, 313.
 Honey, Scorched—239.
 Honey, Selling—192, 267.
 Honey, Shipping—338.
 Honey, Shortage—275.
 Honey, Spinning—132.
 Honey, The Bees Analysis—56.
 Honey House Floors—166.
 Honey Markets—25, 32, 68, 106, 135, 157, 169, 171, 192, 211, 263, 319, 353, 390.
 Honey Plants, Some Southern—151.
 Honey Prices—85, 301.
 Honey Production in Kansas—7.
 Honey Production in the Sage District—295.
 "Honey Yellow"—233.
 Horticultural Complaints—301.
 Hydrometer in Commercial Beekeeping—160.

Improving Stock—312.
 Increase—96, 97, 166, 205, 385.
 Increase With Large Hives—93.
 Increase With Pound Packages—16.
 Inspection—123, 159, 160.
 Inspection in Michigan—242.
 Insulators for Beehives—24, 129.
 Intensive Beekeeping—119.
 Italian Beekeepers, Warning to—156.

Japan, Bees to—155.
 Jasmine, Yellow, Does It Poison Bees?—157, 243.
 Jumbo and Langstroth Hive—8.

Kansas, Honey Production in—7.
 Kindig's Work—351.
 Kodaks—385.

Lady Expert With Bees—155.
 Langstroth and Jumbo Hive—8.
 Laws and Beekeeping—48.
 Laying Workers—239, 348.
 Legal Service Department—383.
 Le Sturgeon, E. G.—197.
 Locations—61, 203, 349.
 Locations in Florida—34.
 Locations in Nebraska—63.
 Louisiana for Bees—167.

Macedonian Beekeeping—373.
 Mangrove, Black—151.
 Markets, Stimulating—49.
 Mating, Controlled—273.
 Mating of Queens—203.

MEETINGS—

Arkansas—99.
 Cayuga County—350.
 Colorado—207.
 Idaho—279.
 Illinois—28, 60, 350, 387.
 Iowa—23, 386.
 Kansas—23.
 Louisiana—11, 315.
 Maryland—350.
 Minnesota—25.
 Mississippi—350.
 Missouri—169.
 Montana—100.
 National—25, 60, 161.
 Nebraska—24, 28, 135.
 New Jersey—25, 350.
 New York—60, 98, 242, 243, 349, 279.
 Omaha—382.
 Ontario—60, 387.
 Pennsylvania—23, 207, 279.
 St. Louis—207, 314.
 Tennessee—279, 350.
 Texas—28, 133.
 Washington—386, 422.
 Western N. Y.—25.
 Wisconsin—63, 133, 243, 279, 422.
 Wyoming—279.
 Merrill of Kansas—14.

Mexico, Beekeeping in—87.
 Microscopic Studies—48, 242.
 Migratory Beekeeping—342.
 Millen to Ontario—279, 345.
 Miller, C. C., to Have Rest—384.
 Miller's Answers, Dr.—26, 61, 96, 129, 165, 201, 238, 277, 311, 348, 384, 419.
 Minnesota Inspection—11.
 Moisture—167.
 Morale of Colonies—228.
 Morgan, R. A.—381.
 Morocco, Beekeeping in—191.
 Moths—202, 276, 348, 385, 421.
 Moths in Extracting Combs—263.
 Mould as an Enemy of Bees—301.
 Moving Bees—27, 28, 98, 130, 240, 385.
 Moving Short Distances—166.
 My Neighbor's Garden—189.
 McCray, A. H.—243, 264.

Nails, Naming—346.
 National Association, Policy and Aims of—279, 340, 371.
 National Forests, Bees in—91.
 Nectar and Nectar Secretion—403.
 Nectar Secretion and Temperature—414.
 Netherlands Bees—373, 379.
 New Zealand Honey Grading—371.
 Nosema-Disease, Observations On—223, 260, 298.
 Nuclei Without Queens—130.

OBITUARY OF—

Baldrige, M. M.—100.
 Benton, Frank—197.
 Comire, O. A.—60.
 Dines, Oscar—135.
 McCray, A. H.—243, 264.
 Miller, Hamlin B.—99.
 Pryal, W. A.—61.
 Secor, Eugene—207, 230.
 Thornton, John A.—135.
 Theiler, Jos.—373.
 Werner, L.—133.
 Ontario, New Building for—422.
 Organization of Beekeepers—229.
 Orient, Beekeeping in—194.
 Outapiaries, Success With—367.

Packages (See Pound Packages).
 Packing Bees—313.
 Packing Cases—28.
 Paralysis, Is It Caused by Cryptogams?—305.
 Paralysis of Bees—89, 293.
 Parks, H. B. to Texas—279.
 Parthenogenesis—170.
 Partnerships—239.
 Paste for Tin—62, 99, 135, 169, 242, 351.
 Pasturage—348.
 Pennyroyal—161.
 Physiology of Bees—11.
 Pioneer Bee History—306.
 Plant Books—206.
 Poison, Is Yellow Jasmine?—157.
 Poison Ivy—63.
 Pollen—167, 168.
 Porto Rico Beekeeping—156.
 Pound Packages—27, 61, 120, 129, 130, 203, 271.
 Pound Packages by Parcel Post—154.
 Pound Packages, Increase With—16.
 Pound Packages, Releasing Bees From—22.
 Pound Packages, Shipping—58.
 Profit From Bees—349.
 Prolific Bees—169.
 Propolis Poisoning—98.
 Punic Bees—23, 190, 417.
 Purity of Bees—240.

Queen Breeder, A Successful—236.
 Queen Breeders Swamped—242.
 Queen Breeders vs. Queen Buyers—264.
 Queen-cells—28, 203, 239.
 Queen-cells Not Destroyed—278.
 Queen Condition After Natural Swarming—335.
 Queen Excluder—277.
 Queen Introduction—28, 309.
 Queen Introduction and Bee Behavior—419.
 Queen Introduction, Smoke Method—233.
 Queen-mating Nucleus—54, 61.
 Queen Mating Over Colonies—57, 164.
 Queen Mating, Pedigreed—340, 422.
 Queen Rearing—62, 131, 165, 203, 239, 312.
 Queen Rearing, Barbeau System—234, 308.
 Queen Rearing Over Queenright Colonies—235.
 Queen Rearing, Wholesale—259.
 Queens—348, 349, 385, 421.
 Queens, Behavior of—314.
 Queens, Breeding, Selecting—244, 310.
 Queens, Clipping—239, 386, 420.
 Queens, Caging—278, 348, 381.
 Queens, Confining During Honeyflow—100.
 Queens, Finding—129, 207.
 Queens Leaving Hive—239.
 Queens Lost on Mating Trip—242, 420.
 Queens, Kind of—420.

Queens, Marking—124, 165.
 Queens, Mating—204.
 Queens, Obstinate—231.
 Queens, Overworking—406.
 Queens, Painting—21.
 Queens, Prolific—48.
 Queens, Refrigerating—156.
 Queens Reared from Grafted Larva—134.
 Queens, Two in One Hive—312, 410.

Records—202, 267.
 Red-bud—191.

REPORT FROM—

Arizona—99.
 Idaho—99.
 New York—19.
 Ohio—9.
 Tennessee—134.
 Texas—99.
 W. Virginia—134.
 Requeening—26, 62, 97, 166, 167, 203, 263, 312.
 Roaches—132, 202.
 Robbers, Queenless—311.
 Robbing—158, 277.
 Rosser, Jno. H., in Hamilton—263.
 Royal Jelly—48, 166, 168.

Sagging, Prevention of—199.
 Samaritans, Are We?—337, 370, 407.
 Santo Domingo—343.
 Sections—62, 202.
 Sections, Old—131.
 Senses of Bees—226.
 Sense Organs of the Bee—57.
 Separating Can for Wax and Honey—83.
 Shade Boards—348.
 Shade for Bees—346, 386.
 Shaking Bees—62, 313.
 Shares, Bees on—11, 18, 132.
 Shed for Bees—97.
 Shipping Bees—130.
 Shipping Bees in Refrigerator Cars—381.
 Shipping Bees, Is Water Necessary?—413.
 Shoestring Vine, or Bluevine—124.
 Short Course, New York—121.
 Short Course, Ontario—133.
 Short Courses—135, 380.
 Short Courses, California—11, 43.
 Sight of Bees—97.
 Smokers—132.
 Snow About Hives—49.
 Snow, Ashes on—100.
 Soldering Honey Cans—270.
 Soldier Beekeepers—302.
 Soldiers, Beekeeping for Disabled—229, 279.
 Soldiers Raising Bees—127.
 Sorghum for Bee Feed—167.
 Spacing for Combs—815.
 Spangler, D. W.—418.
 Spanish Needle for Winter Stores—268.
 Spraying During Bloom—59, 170.
 Spring Building Up of Colonies—79.
 Spring Losses—24.
 Spring Management—85.
 "Springing Bees"—126.
 Stingless Bees—239.
 Stings of Bees—342, 384.
 Sugar, Raw for Feed—98.
 Summer Management—92.
 Supers, Care of—131, 238.
 Supers With Glass—62.
 Swarm Control—97, 129, 132, 203, 239, 385.
 Swarm Control With Comb Honey—188, 266.
 Swarm Control with Extracted Honey—187.
 Swarming—131.
 Swarming Impulse—55.
 Swarms, Drawn Combs for—129.
 Swarms, Hiving—349.
 Swarms Leaving—277.
 Sweet Clover—166.
 Sweet Clover, A Booster for—381.
 Sweet Clover, A Weed—410.
 Sweet Clover, Blue Flies on—347.
 Sweet Clover in Montana—19.
 Sweet Clover, Yellow—99.
 Switzerland—24.
 Syrup for Bees—202.

Temperature and Nectar Secretion—414.
 Temper of Bees—170.
 Texas Condition, Change in—10.
 Texas, Disease Control in—12.
 Texas Experimental Apiary—135.
 Texas, Extension Work in—60.
 Texas Inspection Meeting—128.
 Texas to Experiment—157.
 Theiler, Jos., Death of—373.
 Tins for Honey—277.
 Tobacco Honey—63, 119, 125.
 Transferring—96, 129, 165, 201, 238, 275, 349.
 Transferring From House Wall—167.
 Translations—300.
 Traps—203.
 Trips, How Many for a Bee?—300.
 Trucks, Use of—419.

Uniting—27, 62.
 Uniting Bees—152, 239.

Ventilation of Hives—275.
 Virgin Queens—167.
 Virgin Queens, Care of—17.
 Virgin Queens, Introduction—90, 133, 170, 241, 277, 306.
 Virginia Islands, Honey on—167.

War Losses of Beekeepers—84.
 Water, Is it Necessary in Shipping Bees?—407, 413.
 Wax Rendering—162.
 Weak Colonies, Saving—205.
 Winter Case, A New—13.
 Winter Case, Demuth—421.
 Winter Equipment—313.
 Wintering—61, 165, 203, 348, 386, 420.
 Wintering in Cellar—26, 62, 303, 349, 384.
 Wintering in Colorado—93.
 Wintering in 8-Frame Hives—93.
 Wintering in Small Buildings—61.
 Wintering Out of Doors—83, 238.
 Winter Killing—240.
 Winter Packing—129, 166.
 Winter, Preparation for—263.
 Winter Problem of South—49.
 Winter Protection, Value of—334.
 Winter, Room for—312.
 Winter Stores—301.
 Wire Kinks—416.
 Wisdom of the Bee—94.
 Women, Beekeeping for—22, 95, 168, 204, 243, 310, 383.
 Worker Bee, Tools of—20.

Yellow Jackets—97, 169, 206, 242.
 Yellow Jackets in a Beehive—411.
 Yellow Jasmine (See Bee Jasmine).
 You Can if You Will—158.

ILLUSTRATIONS

Allen, Grace—127.
 Automobile and C. D. Stuart and Wife of California—94.

APIARY OF—

Allen, Grace—127.
 Bungler, Roy—369.
 California—368.
 Colorado—369.
 Dagestan—145.
 Danielson, D.—93.
 Diemer, J. F.—368.
 Harrison, J. A.—253.
 Hutchinson, Edw.—164.
 Iowa (See Western Honey Producers).
 Jaffa—194.
 Keene, O. A.—9.
 Krome—F. W.—126.
 Macedonia—380.
 Maple Honey Co.—92.
 Mendleson, M. H.—297.
 Mississippi River—198.
 Montezuma Mountain—306.
 Palmer—C. B.—17.
 Provansal, P.—73.
 Richardson—50.
 Rauchfuss—374.
 Sedes—380.
 Simmons, L. O.—227.
 Small, Asa V.—309.
 Washington Experimental—225.
 Welch, E. A.—367.
 Western Honey Producers—331, 332, 333.
 Wilson—331.
 Wing, J. E.—260.
 White Sulphur Springs—340.
 Australian View—298.

Banana—152.
 Barbeau Preparing Queen-Cells—234.
 Barrels for Honey—339.
 Bean, Wild—116.
 Beaver Dam in Colorado—376.
 Bee-Balm—117.
 Bee-Laboratory of Maryland—289.
 Blue Curl—189.
 Benton Caravan Crossing Persia—307.
 Benton, F.—308.
 Boy and Girl Club Pictures—86, 87, 88.
 Box Hive Dissected—7.
 Bringing Home the Honey—346.
 Brown, Miss, of Hawaii—155.
 Brvant, D. M., in Rosary—237.
 Buckeye or Horse Chestnut—299.
 Bungler, Roy and Wife—8.
 Bumblebees' Nest—409.
 Bumblebee Queens—408.

Cage, Smith's Push-in—58, 59.
 Camel Carrying Honey—195, 196.
 Carload of Bees Going South—198.

Carpet Grass—16.
 Cherries in Montana—19.
 Chinaberry Tree of Florida—271.
 Clover in Bloom—200.
 Club Boys Getting Instructions—382.
 Coleman, Prof. G. A., of California—47.
 Cotton Plant in Bloom—80.
 Cotton Ready to Pick—81.
 Crawford, H.—375.
 Crawford Packing House—377.

Demuth, G. S.—44, 89.
 Dickinson C. B.—52.
 Diemer's Adjustable Entrance—53.
 Display, Kansas—1.
 Eucalyptus of Australia—266.
 Exhibit, British Columbia Flower Show—278.
 Extractor of Livingston—416, 417.
 Frames Showing Size and Shape of Cluster and Honey Circle—51.
 Frame Wiring, Miller Method—199.

Galberry—153.
 Gentian, Fringed—117.
 Giant Bees—Benton's Travels—310.
 Gladiolus Flower—155.
 Graham, Migratory—125.
 Gray Gum—265.
 Guatemalan Ant Acacia—405.

Harbison Canyon—122.
 Harbison's Former Home—123.
 Harbison Mountain—109.
 Hedge Nettle, Honeybee On—403.
 Hive Cart of H. G. Sanders—419.
 Home, Sweet Home—163.
 Honey All Time in Air—189.
 Honeybee, Glands of—56.
 Honey Heater of Collier Bros.—21.
 Honey House in Sections—334.
 Honey House of C. B. Palmer—18.
 Honey House of H. E. Roth—268.
 Honey Sign of Roth—267.
 Horse Chestnut or Buckeye—299.
 Hospital Colony for Foulbrood—333.
 Huckleberry, Black—119.

Ishida, T. K.—188.

Johennig, Shuley V.—23.
 Justice, C. B.—45.

Ladyslipper—116.
 LeStourgeon, E. G.—197.
 Loading Comb Honey—269.
 Locust, Black—116.
 Livingston Extractor—417.

Log Hive—8.

Mangrove Bloom—151, 152.
 Mating Nucleus Box of C. B. Bankston—54.
 McCray, The Late A. H.—264.

MEETINGS—

California—46.
 Kansas—8.
 Mendleson Pictures—295, 296, 297.
 Mendleson, M. H.—44.
 Mendleson Honey House Interior—295.
 Merrill of Kansas—14.
 Merrill Experimental Colonies—335.
 Millen of Ontario—345.
 Monkey Flower—118.
 Morgan, R. A.—331.
 Moving Bees in Steamer, Sommerfeld—198.
 Moving Queen-Rearing Outfit—261.

Nicholls, H. E.—158.
 Nosema Affected Bees' Stomach—223, 224.

Paddock, F. B.—378.
 Palms in Cuba—15.
 Pennyroyal—154.
 Persimmon Tree and Swarm—270.
 Phillips, Dr. E. F.—43.

Queen Cells of Barbeau—234, 235.
 Queen Rearing Outfit of Wing, on Move—260.

Raisin Grapes—161.
 Rankin, D. F.—169.
 Rauchfuss, H.—375.
 Red Bud—191.

Sanders' Hive Cart—419.
 Secor Home—230, 231.
 Secor, The Late Eugene—217.
 Sheppard, W. J. Experimental Garden—226.
 Shipping Cases for Honey—338, 339.
 Skull Cap—117.
 Skeps—379.
 Sladen's Experimental Plan With Two Queens in One Hive—119.
 Smith, Jay, on Ostrich—47.
 Soldier Beekeeper—302, 303, 415.
 Sommerfeld Moving Bees—198.

- Spangler, D. W.—418.
- Spangler Cabin in Mountains—375.
- Sprengel Book—404.
- Stomach of Nosema Bees—223, 224, 225.
- Stretched Cells—347.
- Swarm in Persimmon Tree—270.
- Swarm on Court House Cornice—274, 275.
- Sweet Clover in Montana—19.
- Tanquary, M. C.—378.
- Tarweed—190.
- Terisse, Andre, Home of—57.
- Texas Inspection Force—12.
- Texas Map Showing Honey-Producing Regions—82.
- Thirty-Ton Crop of Mendleson—296.
- Tombu, Leon—370.
- Transferring—12.
- Trestle for Beehives—16.
- Truck, Atwater's—413.
- Ward, M. G., Grafting Cells—
- Warren, J. H., and Log Hive—342.
- Wasp Nest in Beehive—410, 411, 412.
- Wax Press, Home Made—162.
- Wax Separator of Crane—83.
- Western Honey Producers' Plant—333.
- White, G. F.—262.
- Wing Apiaries—260.
- Wing Family, J. E.—259.
- Wing Queen-Rearing Outfit on Move—260.
- Winter Case of Reynders—13.
- Winter Packed Bees in Colorado—93.
- Women Workers in Mendleson Yards—296.
- Wonga Wonga Vine—298.
- Yellow Rattle—118.

CORRESPONDENCE

- Abushady, A. Z.—376.
- Allen, Mrs. Armstrong—127.
- Anderson, Bruce—243
- Appleton, F. G.—268.
- Archdekin, J. F.—11.
- Atchley, W.—170.
- Attridge, A. J.—417.
- Atwater, E. F.—236, 412.
- Baldensperger, P. J. 85, 194.
- Barbeau, A.—300.
- Barrat, G.—413.
- Bell, J. A.—207.
- Best, H.—134.
- Blaker, C. D.—159.
- Bohrer, G.—5.
- Bonney, A. F.—99, 164, 205, 243, 270, 347, 411.
- Brenner, H.—89, 125, 342.
- Bridge, A. M.—276.
- Broomene, T. J.—91.
- Brunnich, K.—56.
- Bunger, Mrs. R.—168
- Burton, S. H.—124.
- Caillas, A.—232.
- Cameron, A. D.—125.
- Carling, A.—206.
- Carr, E. G.—236.
- Cole, E. M.—306.
- Copeland, A. T.—63.
- Cory, E. N.—350.
- Coverdale, F.—58.
- Craft, P. J.—126.
- Craig, W.—205.
- Crane, J. E.—82, 164, 226, 237.
- Dadant, C. P.—50, 79, 158, 187.
- Dadant, Chas.—55.
- Dadant, L. C.—162.
- Dadant, M. G.—171, 338, 367.
- Dalton, J.—412.
- Davie, C. F.—197, 344.
- DeLacy, J. T.—119.
- Diemer, J. F.—53, 152, 241.
- Dixon, Gordon—133.
- Dougherty, J. A.—9.
- Durham, W. W.—63.
- Durtschi, A.—205.
- Dye, A. G.—135.
- Evitt, E. E.—135.
- Fairchild, A. H.—63.
- Flood, L.—169.
- Fountaine, O.—308.
- Fowler, C. E.—98, 341, 415.
- Fox, Elias—126, 206, 314.
- Frenay, P. J.—379.
- Gallup, E.—14.
- Gray, W. H.—345.
- Green, J. A.—346.
- Greiner, G. C.—19, 231, 271.
- Griffiths, W.—371.
- Harbison, J. S.—268.
- Hassinger, E.—267.
- Harting, J. W.—127.
- Hawkins, K.—108, 314, 414.
- Hendricks, Jno.—24.
- Herman, J. M.—99.
- Hogg, B. Y.—206.
- Hopkins, I.—134, 160, 371.
- Justice, C. B.—273, 371.
- Kaler, S.—100, 170.
- Kaufman, J. D.—19, 99.
- Keene, O. A.—23.
- Kelsey, W. C.—170.
- Kerr, L. E.—346.
- Kindig, B. F.—242, 340.
- Lantis, W. W.—314, 350.
- Latham, Allan—154, 233.
- Lee, A. W.—124.
- Leonard, L. D.—100.
- LeStourgeon, E. G.—128.
- Lovell, Jno. H.—115.
- Luebeck, F. W.—133.
- Lundie, L. B.—18.
- Lusher, A. E.—413.
- MacDonald, D. M.—20, 94, 126.
- Markham, F.—25.
- Merrill, J. H.—334, 347, 410.
- Millen, E. E.—158, 201.
- Miller, C. C.—17, 26, 55, 61, 96, 129, 165, 188, 201, 235, 238, 277, 311, 348, 384, 419.
- Miller, A. C.—162, 235, 274, 299, 309, 419.

- Miller, E. S.—199.
- Moore, Ray—91.
- Murry, H. D.—93.
- Myers, H. M.—35.
- Newell, W.—350.
- Ohlinger, C. F.—346.
- Okerlundt, E.—199.
- Palmer, C. B.—92.
- Pammel, L. H.—410.
- Parks, H. B.—408.
- Parrich, M. S.—99.
- Pellet, Frank C.—46, 59, 80, 129, 151, 160, 230, 259, 295, 331, 374, 411.
- Pennell, R. L.—100.
- Pettit, Morley—93, 206, 275, 335, 381.
- Pettit, R. H.—24.
- Petty, G.—126.
- Phillips, E. F.—302.
- Provensal, P.—87.
- Queen, D.—124.
- Ragland, E. A.—123.
- Rankin, D. F.—169.
- Rayment, T.—265, 297.
- Reynders, C.—13.
- Rice, J. W.—99.
- Richardson, F. B.—267, 416.
- Ritland, O.—15.
- Robinson, T. P.—125.
- Rockwell, W. K.—63.
- Rojina, F. A.—422.
- Rosensweet, Nahman—351.
- Rossnick, W. C.—153.
- Rouse, J. W.—99.
- Sanders, H. W.—419.
- Sanderson, J. R.—242.
- Schnack, C. F.—169.
- Schumacher—24.
- Scott, J. S.—88.
- Shallard, Major—233, 272.
- Shawler, L. A.—164.
- Sheldon, C. E.—99.
- Sheppard, W. J.—58, 93.
- Sherman, S. L.—201.
- Sladen, F. W. L.—118.
- Smith, E. C.—155.
- Smith, E. D.—242.
- Smythe, F. R.—266.
- Sommer, A.—170.
- Steinbrunn, W. C.—306.
- Stockli, Fern—21.
- Stuart, C. D.—16, 189.
- Swarts, D. L.—170.
- Tabusteau, H.—343, 373.
- Taylor, H. M.—52.
- Tilson, E. V.—98.
- Timm, O. E.—24.
- Todd, F. D.—418.
- Toureaud, Q.—191.
- Townsend, T. R.—414
- Trelease, W.—403.
- Trelex, Terisse—57.
- Tyler, F.—99.
- Vanden Berg, J.—16.
- Van Rouzelen, A. G.—100, 314.
- West, N. D.—204.
- Wharton, C.—205.
- White, G. F.—223, 260, 298.
- Wilson, Emma—22, 95, 168, 204, 243, 310, 383.
- York, Geo. W.—279, 410, 422.

CLASSIFIED DEPARTMENT.

Advertisements in this department will be inserted for three cents per word, with no discounts. No classified advertisement accepted for less than 35 cents. Count each initial or number as one word. Copy for this department must reach us not later than the 20th of the month preceding date of issue. If intended for classified department it should be so stated when advertisement is sent.

BEEES AND QUEENS

- FOR SALE—Three-band Italian queens. W. T. Perdue, R. D. No. 1, Fort Deposit, Ala.
- PACKAGE BEES—April and May delivery — 1-lb. package, with untested Italian queen, \$3.50; 25 1-lb packages, with queens, \$3.25 each; 2-lb. package, with queens, \$4.50; 25 2-lb. packages, with queens, \$4.25 each. Safe arrival guaranteed Further particulars upon request. Caney Valley Apiaries, Bay City, Texas. J. D. Yancey, Mgr.
- FOR SALE—125 colonies Italian bees, 10-frame, 2-story; modern; A-1 condition; no disease. Box 151, Tucson, Ariz.
- FOR SALE—Italian queens, from best disease resistant stock, mailed as soon as hatched. Improved method for introducing with every order. Prices, April to October, 1, 75c; 10, \$6; 50, \$25. Order now for spring delivery. James McKee, Riverside, Calif.
- FOR SALE—Alfalfa clover blend honey in 60-lb. cans; sample if desired, \$18.50 per can. \$2 per case, f. o. b. here. W. E. Liebert, St. Anthony, Idaho.
- CASH for extracted honey, white or amber, in 5 or 10-lb. cans. Send sample and say price. T. Lang, 1572 N. Halsted St., Chicago, Ill.
- BEEES BY THE POUND, ALSO QUEENS— Booking orders now. Free circular gives prices, etc. See larger add elsewhere. Nueces County Apiaries, Calallen, Texas, E. B. Ault, Prop.

MAKE YOUR OWN FOUNDATION and earn money making foundation for others. The simple, easy way, machine and outfit; hand, \$100; electric power, \$350. Grand Haven Pattern Works, Grand Haven, Mich.

BEEES AND QUEENS from my New Jersey apiary. J. H. M. Cook, 141f 84 Cortland St., New York City.

FOR SALE—Italian bees and queens (the kind that fill from 2 to 6 supers). Bees, \$12 a colony; queens, \$2 each, 6 for \$11. Queens go by mail; bees by express. Order direct from this ad. Miss Lulu Goodwin, Mankato, Minn.

GOLDENS that are true to name. Untested queens, 1, \$1.25; 5, \$6.50; 12, \$11.50; 30, \$40; 100, \$75. Garden City Apiaries, San Jose, Calif.

FOR SALE—Leather colored Italian queens, tested, June 1, \$1.50; untested, \$1.25; \$13 a dozen. A. W. Yates, 15 Chapman St., Hartford, Conn.

"SHE SUITS ME" Italian queens, \$1.15 each, from May 15 to October 15; 10 or more, \$1 each. Allen Latham, Norwichtown, Conn.

FOR SALE—Pure 3-banded Italian queens, as good as you can buy with money, from June 1 to September 1. J. F. Diemer, Liberty, Mo.

FOR SALE—100 colonies of bees, most all in new hives with Hoffman frames. Plenty of stores. Address James Johnson, Box 265, Pocahontas, Ark.

HONEY AND BEESWAX

WANTED—Fancy Clover comb honey. The Forest Honey Co., 2323 S. Woodstock St., Philadelphia, Pa.

WANTED—To buy, comb honey. Edw. A. Winkler, Joliet, Ill.

FOR SALE—25 cases fine clover honey in new 60-lb. cans. Edw. A. Winkler, Joliet, Ill.

FOR SALE—California Wonder corn for seed. A new white dent. Has averaged as high as six good ears per stalk, or over 300 bushels per acre. Also 50 tons of ensilage. A great money maker. Order now. Price 35c per lb. James McKee, Riverside, Calif.

WANTED—To buy—Extracted honey. State price, how packed. Send sample. Harmony Bee and Honey Co., White Bear Lake, Minn.

WANTED—Light extracted honey, any amount. Send sample and best cash price f. o. b. Ft. Collins, Colo. A. A. Lyons, Ft. Collins, Colo.

FOR SALE—Light amber extracted honey; fine quality for table. Put up in 60-lb cans. A. L. Kildow, Putnam, Ill.

FOR SALE—New crop clover honey; put up in new 60-lb cans, 2 to the case, 25c per pound, f. o. b. here. W. B. Crane, McComb, O.

OUR CROP OF HONEY is now ready for shipment. It is a good grade white clover with a very small trace of basswood, almost water white. It is put up in new 60-lb. tin cans, two to the case. This honey was all produced by ourselves above queen-excluders, in nice white combs. Then combs were provided so that no honey was taken off until after the season, when it was thoroughly cured by the bees. It costs more to raise a crop of honey this way, as we do not get as much per colony, so we have to have a little more money for this fancy article than the ordinary honey on the market. Try a small order and we feel sure you will buy no other... We can furnish at the following prices, f. o. b. Northstar: one 60-lb. can \$15.50; in cases of two cans, \$30 a case, in any sized orders. The crop is short this year and will not last long at these prices. We feel quite sure that the price will not be any lower, so do not be disappointed by not ordering early if you are looking for honey as good as money can buy. D. R. Townsend, Northstar, Mich.

FOR SALE—New crop clover extracted honey, two 60-pound cans to case, 26c per pound. Buckwheat and clover mixed, about half and half, 20c per pound.

H. G. Quirin, Bellevue, Ohio.

WANTED—White clover or light extracted honey. Send sample; state how honey is put up and lowest cash price delivered at Monroe; also buy beeswax.

E. B. Rosa, Monroe, Wis.

WANTED—Comb and extracted honey; send sample of extracted and quote your best wholesale price f. o. b. your station, how packed, etc., in first letter. D. A. Davis, 216 Greenwood, Birmingham, Mich.

WE BUY HONEY AND BEESWAX—Give us your best price delivered New York. On comb honey state quantity, quality, size, weight per section and sections to a case. Extracted honey, quantity, quality, how packed, and send samples. Chas. Israel Bros. Co., 486 Canal St., New York, N. Y.

WANTED—Honey, in light and amber grades. Send sample, stating quantity, how put up, and lowest cash price delivered in Spring Valley. Ed. Swenson, Spring Valley, Minn.

FOR SALE—15,000 pounds of fine clover and basswood honey. The best offer takes it if satisfactory. Chester E. Keister, Clarno, Wis.

WANTED—Comb, extracted honey and beeswax. R. A. Burnett & Co., 6A1st 178 S. Water St. Chicago, Ill.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering. Fred W. Muth Co., 204 Walnut St., Cincinnati, Ohio.

FOR SALE

FOR SALE—Gleanings, September, 1907 to December, 1916; all American Bee Journals from January, 1910.

F. A. Wicklein, Percy, Ill.

FOR SALE—3 doz. queen-excluders, wood, zinc; used 2 seasons; no disease; Mondeng manufacture.

F. O. Donnell, Rush City, Minn.

FOR SALE—38-35 Marlin repeating rifle, \$25; excellent condition. Will trade for honey extractor; must be in good shape, not smaller than size 15.

L. C. Johnson, Rid, Wis., R. 3.

FOR SALE—Well-improved 2-acre place two miles north of Mascoutah, on public road. Mike Rothaug, Mascoutah, Ill., Rt. 2.

FOR SALE—5x7 Graphic and outfit, in A-1 condition. If interested in a bargain, write for detail, description and price, Walter Timmerman, 2107 N. Tremont St., Kansas City, Kans.

FOR SALE—Cedar or pine dovetailed hives; also full line of supplies, including Dadant's foundation. Write for catalog.

A. E. Burdick, Sunnyside, Wash

FOR SALE—200 new 10-frame cross style, reversible bottom-boards at 50 cents each; 200 new flat reversible covers at 60 cents each; 5,000 all-wood extracting frames at \$5 per 100; 100 new Alexander feeders at 20 cents each; 150 Boardman feeders without cap or jar, at 12 cents each. All above goods are factory made and have never been used. I also have some 8 and 10-frame hives complete which space does not permit to mention here. Write M. E. Eggers, Eau Claire, Wis.

WANTED—An experienced man for 1920 to work outyards for bulk comb honey. References required.

John W. Cash, Bogart, Ga.

FOR SALE—"Superior" Foundation (Weed process). Quality and service unexcelled. Superior Honey Co., Ogden, Utah.

WANTED

WANTED—Barnes Saw Table No. 4. Give particulars and price in first letter. L. E. Miles, Box 407, Balboa, Canal Zone.

WANTED—To buy the sweet water from melting old combs or cappings. Edw. A. Winkler, Joliet, Ill

WANTED—Cheap for cash, honey extractor, Winchester 12-gauge shotgun, Stevens double-barrel. Lorenzo Clark, Winona, Minn.

WANTED—For exhibition purposes, naturally built combs, partly or fully drawn out. Such combs should not have over 25 per cent drone-comb and should be the product of the bees themselves, without use of foundation. Write us describing what you have and we will name our price on same. American Bee Journal, Hamilton, Ill.

WANTED—Several one-frame observation hives with supers. Taylor, Box 127, Sacramento, Calif.

WANTED—Your old combs, cappings or slumgum to render into beeswax by our high steam pressure wax presses. Dadant & Sons, Hamilton, Ill.

WANTED—Your order for "Superior" Foundation. Prompt shipments at right prices. Superior Honey Co., Ogden, Utah.

SUPPLIES

WANTED—About 20 10-frame hives, 50 extracting supers, hand extractor and general supplies. Stanthrop Farm, Holliston, Mass.

MY PERFECT FEEDER (improved). Sample tool and printed instructions, 24c. Get ready for spring.

Dr. Bonney, Buck Grove, Iowa.

BEEKEEPERS' SUPPLIES at reasonable prices. Elton Warner, 150 Cumberland Ave., Asheville, N. C.

FOR SALE—New; two 5-gallon cans in a cleated end case at \$1.20 per case, f. o. b. your station. Direct from factory.

Edw. A. Winkler, Joliet, Ill.

FOR SALE—New cypress hives, reversible bottom-boards, telescope metal covers, self-spacing frames, of quality and price that will please you. Manufactured by myself. Write for particulars.

O. L. Rothwell, Gillett, Ia.

SEND us a list of goods wanted and will quote you lowest prices. We are the money-saving house. Price list free. Try us.

H. S. DUBY & SON, St. Anne, Ill.

SITUATIONS

WANTED—One or two good queen-rearing men to begin work February 15, 1920. Nueces County Apiaries, Calallen, Texas.

WANTED—An experienced farmer and beekeeper wants a position in an apiary in the State of Florida. Chas. Ramig, Route 2, Manchester, N. H.

WANTED—Good man who knows the bee business. Permanent position. Geo. E. Duis, Grand Forks, N. Dak.

WANTED—Experienced beeman by year, to begin in January; straight salary, or salary and percentage. Give age and experience. Students' Bee & Honey Co., 1716 Rose St., Berkeley, Calif.

WANTED—To correspond with beemen who can use black bees in gums with queens, or in packages without queens. H. E. Sanders, Kentwood, La.

MISCELLANEOUS

WANTED—Beeswax, old combs and cappings to render on shares. Will pay highest market price and buy your share of the beeswax. F. J. Rettig & Sons, Wabash, Ind.

QUEENS, SELECT THREE BAND

WRITE FOR PRICES

HARDIN S. FOSTER COLUMBIA TENN.



THERE IS BIG MONEY AND GENUINE PLEASURE FOR YOU in the fascinating Rabbit Industry — *But You Must Know How.* Use the knowledge of the best brains in the business and *Start Right.* Send for free information about Rabbit Keeping, and full particulars *Today.* GIBSON'S CORRESPONDENCE SCHOOL OF RABBIT HUSBANDRY (Supervised by Judge Chas. S. Gibson), 5152-S, W. Madison St., Chicago, Ill.

PAINT WITHOUT OIL

Remarkable Discovery That Cuts Down the Cost of Paint Seventy-Five Per Cent.

A Free Trial Package is Mailed to Everyone Who Writes.

A. L. Rice, a prominent manufacturer of Adams, N. Y., has discovered a process of making a new kind of paint without the use of oil. He calls it Powdrpaint. It comes in the form of a dry powder, and all that is required is cold water to make a paint weather proof, fire proof, sanitary and durable for outside or inside painting. It is the cement principle applied to paint. It adheres to any surface, wood, stone, or brick; spreads and looks like oil paint, and costs about one-fourth as much. Write to Mr. A. L. Rice, Manufacturer, 23 North Street, Adams, N. Y., and he will send you a free trial package, also color card and full information showing you how you can save a good many dollars. Write today.

The Townsend Tar Paper Method of Packing

This method of packing for outdoor wintering has given such excellent results that it is now used exclusively by E. D. Townsend & Sons, Northstar, Mich., on their entire 1100 colonies. This is not a mere paper wrapping, as packing material is used at sides as well as top. How it is done, is fully described (with illustrations) by Mr. Townsend in the November number of the Domestic Beekeeper. This issue also contains an excellent article on wintering by Mr. Jay Smith, well known queen breeder and Government extension lecturer.

You will want to read both of these articles—and we want you to do so. Here is our special offer: Send us \$1.00 and we will mail you this November number of the Beekeeper and continue your subscription to the end of December 1920—14 months for \$1.00. Do this today and our word for it you will not regret it. Add 15c extra for Canada postage; 25c for foreign. Address

THE DOMESTIC BEEKEEPER
ALMONT, MICH.

"falcon"

BEE SUPPLIES

"falcon"

HIVES, SUPERS, FRAMES, SECTIONS, FOUNDATION

In fact anything in the line of Bee Supplies

Have you ordered your supplies yet for the season of 1919 which is now with us, or are you waiting for the last moment to come around when the supplies now carried in stock will be nearly exhausted, or the shipping department so busy that they will not be able to give you the quick service which you naturally expect? Just stop and think what would happen if all beekeepers would do this. To relieve the situation and to help conditions in general, get your order in at once.

We are prepared to make immediate shipments from our large warehouses, which were packed to the brim before the season started.

You all know what the "Falcon" line is, and you ought to know what the "Falcon" service is. If you never ordered from us before, better let us have the next order to convince you not only for once, but forever.

Send for the Red Catalog and "Simplified Beekeeping"

W. T. FALCONER MANUFACTURING CO., Falconer, New York

Where the Best Beehives Come From

A NEW BEE BOOK

by the Associate Editor of American Bee Journal

Beginner's Bee Book by Frank C. Pellett

Just issued from the press of the Lippincott Co., Philadelphia.

Attractive cloth binding, nearly 200 pages, illustrated. Price, postpaid, \$1.25.

With a years subscription to American Bee Journal, both \$2.00.

Other books by the same author:—

Productive Beekeeping, 320 pages, a complete manual of commercial honey production. Price \$2.50.

With Beginner's Bee Book, both \$3.50.

Practical Queen Rearing, 105 pages of boiled down information about all practical methods of rearing queens. Price \$1.00. With Beginner's Bee Book, both \$2.00.**Our Back Door Neighbors**. A book of nature tales splendidly illustrated with photographs. Price \$1.50. With Beginner's Bee Book, both \$2.50.

Special price for all four books, \$5.50. All four books and American Bee Journal one year, \$6.25.

AMERICAN BEE JOURNAL, Hamilton, Illinois**BEES BY THE POUND**

Booking orders now with 10 per cent down, balance just before shipping. For full remittance with order offer the following discounts: 5 per cent for October, 4 per cent for November, 3 per cent for December, 2 per cent for January. We have shipped for several seasons thousands of pounds all over the United States and Canada. Guarantee shipment to be made on time. Free Circular explains, also gives prices on Bees by Parcel Post, Nuclei, etc.

Prices F. O. B. here, by express.

1 pound package bees, \$2.40 each; 25 or more, \$2.10

2 pound package bees, \$4.25 each; 25 or more \$3.83

3 pound package bees, \$6.25 each; 25 or more, \$5.63

Add price of queen wanted when ordering bees

QUEENS

Untested, \$1.50 each; 25 or more \$1.35.

Tested, \$2.50 each; 25 or more, \$2.25

Select Tested, \$3 each.

NUECES COUNTY APIARIES E. B. AULT, Calallen, Texas
Prop.**WESTERN BEEKEEPERS!**

We handle the finest line of bee supplies. Send for our 68-page catalog. Our prices will interest you.

The Colorado Honey-Producers' Association
1424 Market Street, Denver, Colo.

BEST GOLDEN ITALIANS**BEN G. DAVIS, SPRING HILL TENN.**

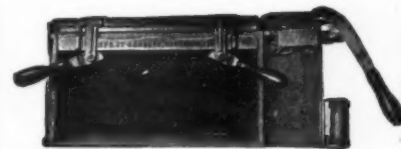
Don't stop advertising.

because honey is high. Make it more in demand, so the price will stay where it is. Little stickers on your letters, papers, etc., will help. Printed as below in bright red.



Price of 1,000 gummed 35c.

American Bee Journal Hamilton, Illinois



PAT. JULY 30, 1918

C. O. BRUNO NAILING DEVICE

Made for the Huffman Brood Frames. A combined Nailing, Wiring and Wedge Clamping Device. Has been tried and is guaranteed to do accurate work.

PRICE \$7.50

Complete directions for operating are furnished with each device.

Manufactured by C. O. BRUNO
1415 South West Street, Rockford, Illinois

ROOT SERVICE

was greatly extended when the Kretchmer Manufacturing Co., of Council Bluffs, was reorganized under the new corporate management and name, "The A. I. Root Co., of Iowa. Located in the best shipping center of the great Middle West, the new Company will be in the position not only to give you prompt and complete service, save you freight and time, but also to furnish you with the Root guaranteed line of supplies.

The A. I. Root Co. of Iowa places itself at your service, and is anxious to aid you in making Beekeeping more interesting, more productive and more profitable.

As a means to this end the Company is installing extensive new machinery, such as the Airco Wax Machines and the Airline Honey-Blending and Bottling Machines. Be certain to write us about the wax you want rendered, or which you have for sale; also, about your honey.

The A. I. Root Co. was incorporated under the laws of the State of Iowa in November, 1919. There is still some stock available for investment.

For guaranteed supplies, prompt service, quick delivery over the shortest possible route, and for a safe, sane and profitable investment, write

The A. I. Root Co.
Of Iowa

COUNCIL BLUFFS,

IOWA

MONEYCOMB

THE ALUMINUM HONEYCOMB

THE WAY TO GREATER PRODUCTION

We are shipping "MONEYCOMBS" all over the civilized world, their success is tremendous.

The question is not, can you afford them, but how can you do without them? Make your bees be efficient.

Beeswax is the most costly product of the honeybee and since wax for comb building can only be produced at the expense of many times its weight in honey it is well that the ingenuity of man has invented one of the greatest aids to profitable beekeeping—the Aluminum Honeycomb.

With MONEYCOMB you can:

1. Produce more honey
2. Extract cleaner, no breakage
3. Control all disease
4. Raise more brood
5. Save loss from melting and destruction by animals and insects

"The Aluminum Comb 'MONEYCOMB' is here to stay; its assistance to beekeepers is invaluable.

"H. B. PARKS, State Apiary Inspector of Texas."

"My honeyflow was so light the bees would not draw out the foundation. I was compelled to use aluminum combs, 'MONEYCOMBS,' for brood rearing, and they proved an unqualified success.

"GEORGE D. SHAFER, Palo Alto, Calif."

"My experience with 'MONEYCOMBS,' the aluminum honeycomb, caused me to rank it with the centrifugal extractor.

"A. Z. ABUSHADY, editor of 'Bee World' and Secretary of Apis Club, Benson, Oxon, England."

"I have conducted exhaustive experiments with 'MONEYCOMB,' the aluminum honeycomb, and can heartily recommend it as the most satisfactory honeycomb I ever used in my long experience of bee raising.

PROF. WILL C. STEINBRUNN,

"Principal of Los Gatos School of Apiculture, San Jose Street, Alameda, Calif."

Our Factory is now fully equipped and your order will be shipped immediately on receipt. Made in Langstroth or Hoffman sizes at 60c per frame, f. o. b., Pasadena. Write for prices on both shallow and Jumbo sizes. Discounts given on large orders.

Booklet "B 1" describing "MONEYCOMBS" mailed on request.

ALUMINUM HONEYCOMB COMPANY

FACTORY AND OFFICE

Chester and Colorado Streets, Pasadena, California

THE FOREHAND FEEDER

This is one of the greatest inventions along this line the bee world has ever known. It is a feeder that it took fifteen years to perfect. It has been in use for nearly twenty-seven years. It is a success, for,

- 1st. There is no cold feeder in the broodnest or on the outside to start robbing.
- 2nd. It does not drown or freeze the bees.
- 3rd. It has two uses.
- 4th. It is a convenient time saver. You can feed at any time.
- 5th. It is not an expensive feeder.
- 6th. It saves labor, feed and bees.
- 7th. It IS A GOOD FEEDER.

Write for further information.

BEE SUPPLIES—We handle everything the modern beekeeper needs. Write at once and get the big 35 per cent saving on the greatest part of our supplies. Catalog free.

PRINTING—We have a modern printing plant especially equipped to supply the requirements of the beekeeper. Our long experience and up-to-date plant enables us to give you printing of the finest quality, promptly. Write us for further information and prices.

QUEENS—Forehand's Three Bands need no recommendation. For over a quarter of a century they have been pleasing the best beekeepers throughout the world. They are the kind that are **surpassed by none, but superior to many.** They are thrifty, hardy, gentle and beautiful. Write for our special bee circular. Get your order in **now** before the rush.

POUND BEES—Six thousand pounds is our capacity for the season of 1920. We are now booking orders. After we have booked orders for this amount no more will be received. Get your order in now. Write for circular and prices.

For over a quarter of a century we have been in the bee business on an extensive scale. We know the beekeepers' needs and are now in a position to fill them, it matters not what they are.

W. J. FOREHAND & SONS, The Bee Men

Fort Deposit, Alabama



CHARLES MONDENG
Bee Keepers' Supply Mfg. Plant.

A BIG STOCK OF BEE SUPPLIES

ALL BOXED, ready to ship at once—thousands of Hoffman Frames; also Jumbo and Shallow Frames

of all kinds—100 and 200 in a box. Big stock of Sections and fine polished Dovetailed Hives and Supers.

I can give you bargains. Send for a new price list. *I can save you money.*

Will take your Beeswax in Trade at Highest Market Price

CHAS. MONDENG

159 Cedar Lake Road

MINNEAPOLIS, MINN.

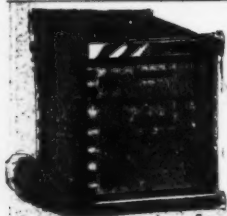
EARLY ORDER DISCOUNTS WILL

Pay You to Buy Bee-Supplies Now

Thirty years' experience in making everything for the beekeeper. A large factory specially equipped for the purpose ensures goods of highest quality. Write for our illustrated catalog today.

LEANY MFG. CO., 90 Sixth St., Higginsville, Mo.

or J. W. ROUSE, Mexico, Mo.



BARNE'S Foot Power Machinery

Read what J. E. Rarent, of Chariton, N. Y., says: "We cut with one of your Combined Machines last winter 50 chaff hives with 7-in. cap, 100 honey-racks, 500 frames and a great deal of other work. This winter we have a double amount of hives, etc., to make with this saw. It will do all you say of it." Catalog and price list free.



W. F. & JOHN BARNES

995 Ruby St., ROCKFORD, ILLINOIS

BEEKEEPER'S SUPPLIES

Everything Required for Practical Beekeeping

Order your supplies now and save money by taking advantage of the early order cash discount. We are prepared to take care of your business; send us your inquiries and we will be pleased to quote you our prices. Send us your name and address and we will mail you one of our new 1920 catalogs when ready.

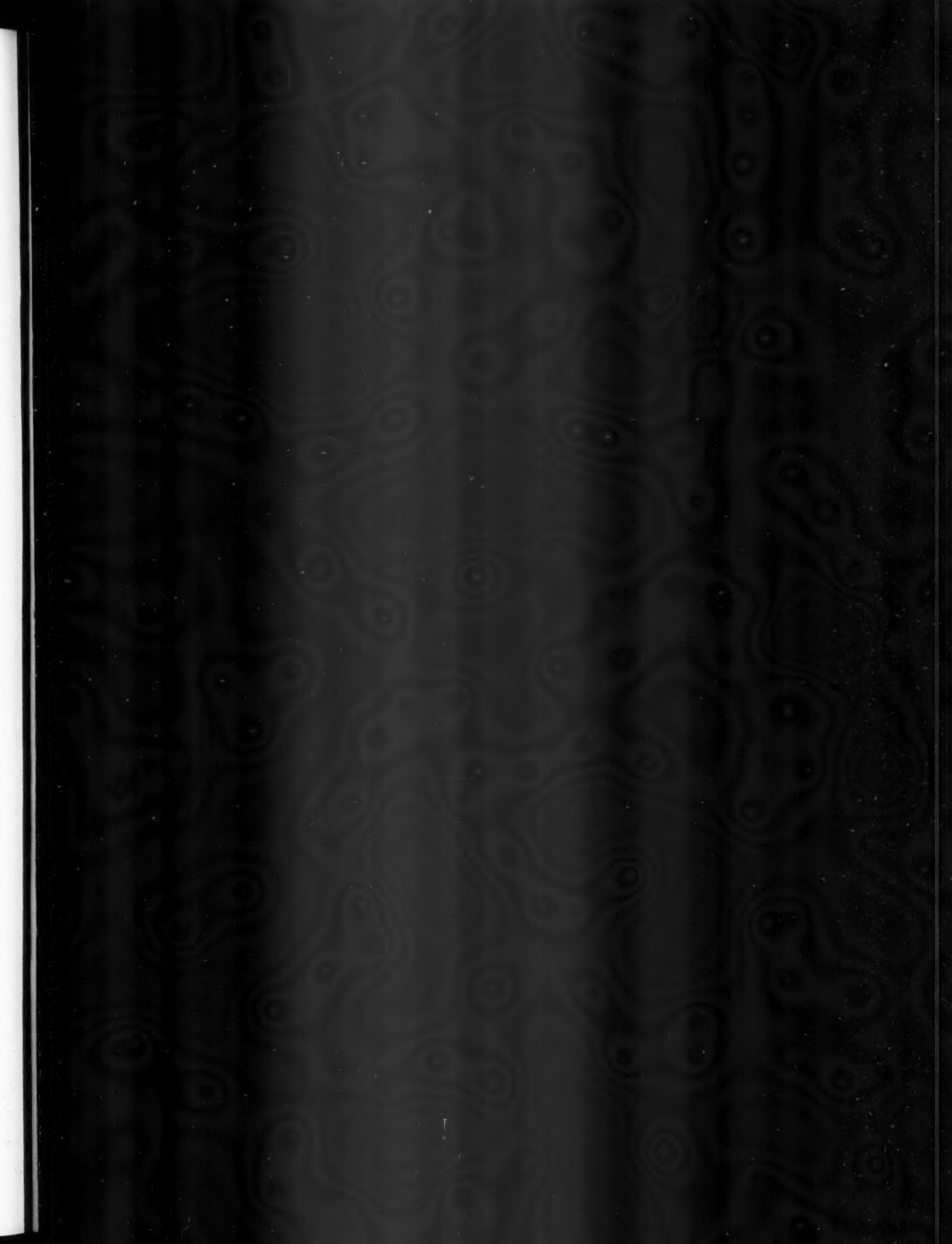
AUGUST LOTZ CO.

BOYD, WIS.

Established 1885

We are still furnishing beehives made of white pine; they will last. A. I. Root Co.'s make of bee supplies kept in stock. Send for catalog giving full particulars; free for the asking. Beeswax in exchange for supplies, or cash.

JOHN NEBEL & SON SUPPLY CO.
High Hill, Montg. Co., Mo.





BECAUSE IT LASTS

That is One Argument in Favor of Cypress as a Beekeeper's Lumber



There are many qualities that make the value in lumber, depending, of course, on the uses to which they are put. But of all virtues that of **endurance** comes first. The wood that resists rot influences longest, especially when the wood is used in a service by

which it is exposed to wet and dry conditions and earth contact—that wood is accredited with being able to give the user the greatest **INVESTMENT VALUE**.



No use tries the lasting qualities of lumber greater than that of Bee Hive construction. It is the very deuce to get lumber that will not too readily rot—unless one gets Cypress lumber. Then there is a good show for endurance that means **real money saved on Repairs You Don't Have to Make**. Try it, Mr. Beekeeper.

STUDY THE WOOD QUESTION

There's one way to get at this matter of endurance—through books of authority. Such are the 43 volumes of the internationally famous Cypress Pocket Library. These books are not "advertising"—they are authoritative references on file in the libraries of scores of technical schools and National institutes. Ask for Vol. 1 to start with; it contains the complete U. S. Govt. Rept. on Cypress, "The Wood Eternal," and a full list of the other volumes; then branch out until you cover the subject.

SOUTHERN CYPRESS MFRS.' ASSOCIATION

1251 Heard National Bank Bdg., Jacksonville, Fla., and 1251 Hibernia Bank Bdg., New Orleans, La.
For quick service address nearest office

HONEY

WANTED

HONEY

Write us what you have to offer in extracted or comb. If comb state how packed, graded and quantity. If extracted, state how put up, mail sample and quote your lowest price. We will buy unlimited quantities if price and quality are right.

C. H. W. Weber & Company

2146 Central Avenue

CINCINNATI, OHIO

HONEY, HONEY, HONEY

We are in the market for large quantities of all kinds of white honey. Mail samples and state price asked in first letter.

"GRIGGS SAVES YOU FREIGHT"

TOLEDO

How about supplies for next season's use! Why not take advantage of the early order discounts.

SECOND HAND 60 POUND CANS

We have a carload or more in cases of two cans, good condition at prices worth your attention.

THE GRIGGS BROS. COMPANY

DEPT. 24

TOLEDO, OHIO

["Griggs Saves You Freight"]

WHY?

To Beekeepers Everywhere :

It is especially to a new generation of beekeepers that we want to say this. The older beekeepers know it. We are a little proud of it, too. Why is this Company today acknowledged everywhere to be the leaders of the world in the Bee Supply business? It is

BECAUSE

We have been the pioneers in introducing to the beekeepers of America the best and most important bee appliances in use today. We have hunted for the new things in beekeeping and proved or disproved their worth and practicability. We have spent fortunes in money and years of time in experimenting on beekeeping ideas.

A FEW EXAMPLES

To mention only a few of these big ideas worked into practical appliances for the beekeeper and so enlarging his possibilities for success, we mention: The Novice Honey Extractor, the Cowan Extractor, the Root Reversible Extractor, the Weed Foundation Process, the Dovetailed Hive, the Hoffman Self-Spacing Frame.

To enlarge on only one of these great benefits to beekeepers, may we draw attention to the fact that we not only make our own latest Root-Weed Foundation Machinery, but we make every machine in the world in which Weed-process foundation is made—and that is practically all of it.

We shall keep going ahead and discovering the new things in bee supplies, just as we have been doing now for 50 years.

THE A. I. ROOT COMPANY

MEDINA, OHIO

